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Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association Northern Minnesota Medical Association and Minneapolis Surgical Society

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MINNESOTA MEDICINE

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TWILIGHT ZONES OF PATHOLOGY AND CLINICAL MEDICINE*

E. L. TUOHY, B.A., M.D.†
Duluth

This is to be neither a general comment on clinical medicine nor an outline of any segment of pathology. Rather is it to point out a few representative fields where these two great agencies of medical precision are either groping independently or failing to work co-ordinately. Various obstacles interpose themselves—the nomenclatures used are too inflexible; precedent and custom keep the pathologist too far away from the patient; the clinician too far away from the operation, the laboratories, or the autopsy room. Just as the student is taught medicine segmentally, so he practises it. Where proven pathological sequences go hand in hand with demonstrable clinical entities, there we find our greatest satisfaction. But, there are still many fields where one must spend far too much time in search for this harmony. Too often we see our hard earned clinical ground taken away from us by a pathological offensive—far too didactic and backed up more by the awe that surrounds any dictum coming "out of a laboratory," than by any actual proven set of facts.

Though it is estimated that from 60 to 75 per cent of all those who consult us have functional complaints, for which (supposedly) there may be no pathological foundation, and though the field for psychotherapy and analysis is enormous, still it is just about as inky a mess for us today as was the whole field of medicine before Virchow and men of his type. If the whole souled (not to say whole time) pathologist has some faults, they are chiefly those of our own contribution. Certainly the Islamite is worse than lost without his Mohammed; no matter how wretchedly he subscribes to his faith, he at least must know which direction is East; and even in the very highest expression of his zeal does he not usually place his idols in the poorest lighted portions of his temple? This, in a word, is an appeal, gentlemen, to a society that has always respected and taught pathology, to bring our pathologists out from under stairways and inaccessible recesses into our councils as well as our confidence, and to ask in all humility that they also shall meet us with the same brotherly frankness. Let us all begin to master the same language.

HOSPITAL RECORDS AND AUTOPSY NOTES

One hundred and sixty autopsy records at St. Mary's Hospital, Duluth, accumulated over a period of about twenty months, have been analyzed. The clinical diagnoses have been contrasted with the anatomical findings. As you will know, these clinical records were put down by at least fifty different doctors; the pathological-anatomical notes were made chiefly by one well trained pathologist.*

At once the thought arises, how much antagonism and divergence was found? Surely enough, but that is not the prime purpose of the segmental analyses I shall make. In fact, the pitting of the clinician against the pathologist is exactly what we should desire to get away from. The wise anatomist begins his autopsy exactly where the clinician leaves off—where the latter is willing to state, "These are my findings to the best of my judgment, and these are the clinical leads—follow them up."

Why did the patient die? This is no more difficult to answer at times than the question, "How did he live?" As far as the necropsist is concerned, the answer to the latter is final—at least when he finishes his work the subject *is* dead. However, the route by which he traveled thereto is often far from definite if clinical sequences are not measured up and evaluated in addition to the

*Read before the Minnesota Academy of Medicine, St. Paul, Minn., Feb. 11, 1925.

†From the Duluth Clinic and St. Mary's Hospital, Duluth, Minn.

*Dr. G. Berdez, Lauzanne, Switzerland; Special student with Wegelin (Bern); Beitzke (Graz); Stilling (Lauzanne); Loewenthal (Normal Histology, Lauzanne); Aschoff (Freiberg, in Brisgau); H. E. Robertson (Mayo Clinic, Rochester).

pathological ensemble that made up the situation at the finish.

Specialism, while fruitful in providing intense application along limited lines, is also likely to be wasteful in minimizing the importance of proportion. The specialist in pathology must be kept familiar with clinical entities, sequences and developments in medicine and surgery.

A discussion in brief of certain groups of conditions where the clinical and pathological viewpoints frequently clash is submitted. This only too clearly indicates the need for more close and harmonious investigation.

ENCEPHALITIS

Mrs. M. Z., aged 39, female, No. 96690. Admitted to the hospital Feb. 18, 1924; died March 3, 1924. *Clinical diagnosis.*—Epidemic encephalitis, Parkinsonian syndrome. *Anatomical diagnosis.*—Brown atrophy of the myocardium and of the liver. Symphysis of the pericardium. Old and extensive pleural adhesions. Chronic congestion of the lungs. Beginning pneumonia, especially of right lower lobe. Acute purulent bronchitis. Status after extirpation of the tubes, the left ovary and subtotal hysterectomy. Small cystic degeneration of the right ovary. Struma diffusa colloides substernalis.

Comment.—The brain in this case showed no gross change; therefore, it is not mentioned in the anatomical findings any more (and rightly) than is the spleen. The microscopical data might be considered a little more determinate since, "moderate perivascular infiltration" was found, but to a very limited degree, etc.

The anatomical findings here do not certainly give any inkling as to this most serious disorder, overwhelming a previously well patient, and producing such characteristic expression, changes in temperament and disturbance in mental and psychic makeup, as to render the patient totally helpless.

Attention is drawn to this not to find fault with the limitations of the pathologist, but to point out that either our methods of study of brain tissue are inadequate, or extraordinary functional changes can take place in the brain without gross tissue perversion. Do we know, even how often perivascular infiltration, with certain types of cells, occurs in a considerable variety of clinical disorders or conditions, or even in health?

DIABETES

Two contrasting cases are submitted. One is a typical atherosclerotic woman of 64, who in the list of autopsy findings did show some "atrophy of the pancreas." However, there was a long list of anatomical findings, including thrombosis of the abdominal aorta, widespread atherosclerotic changes, with coronary sclerosis, arteriosclerotic kidneys, etc. Might not this patient have easily gone on to autopsy, in which the pathologist would have known nothing of the decisive clinical course she had run, and easily have missed the import of a clinical state that is far from dubious, either in the mind of the patient or her physician?

A man, aged 59, came to autopsy, who had been treated elsewhere as a diabetic for about eighteen months. He had an old history of abdominal discomfort and attacks that were undoubtedly from his gallbladder. He died of the late sequelæ thereof, including multiple abscesses in the liver; yet, there was nothing, either grossly or microscopically, found in his pancreas, to indicate abnormality. Why did he have diabetes, and why did he appear to prosper under the usual dietary regime, and for a considerable period with the use of insulin? The pathologist answers as follows: Somewhere in the literature he has found reference to the fact that inflammatory disturbance about the lymphatics in the pancreatic, gall duct, and adjacent areas, prevents the Langerhans hormone from getting via the lymphatics into the circulation. It is known that 10 per cent to 20 per cent of diabetics have their diabetes incidental to chronic inflammatory disease in this area and are very greatly benefited when this pathology is eliminated. It must be obvious, in any case, that since insulin given orally is ineffective, any hypothesis indicating that the natural hormone is absorbed via the gastrointestinal tract is likewise untenable.

AUTOPSIES ON SYPHILITICS

Reference is made to a series of autopsies in known syphilitics. Where definite visceral lesions, such as aortitis, aneurysm, or definite cerebrospinal changes were present, the clinical and anatomical findings closely approximated each other.

On the other hand, where the clinical findings were indefinite, and only positive blood serum data were available upon which a basis of syphilis had been made, it was notorious that the clinician had overlooked a lot of other situations, chiefly tied up with chronic vascular degeneration and its

inevitable influence upon important organs, such as the heart, the kidneys and the lungs.

An instance of optic atrophy occurred, in which it was supposed to be due to cerebrospinal syphilis. At autopsy, however, a large aneurysm of the left internal carotid, with compression of the optic chiasm, was found.

In an instance in which, in an elderly man with positive serological findings in the spinal fluid, the bradycardia was supposedly due to a large cerebral hemorrhage, the pathologist was able to show only very slight terminal hemorrhages in the meninges, but also found these rather extensively through the other organs, and also rather decisively in the bundle of His.

SENILE CHANGES

There are lessons to be learned through familiarity with the sequence of events, as well as pathological changes, that occur in those advancing into the sixth and seventh decades of life with diffuse arterial degeneration. In the cases studied, the prostate had been grossly neglected fairly often. Where outspoken pathology had been obvious in such organs as the heart, the clinician seemed to be satisfied to accept what he found, and looked no further. Perhaps, as to these late degenerative lesions, this made no vital difference either with treatment or prognosis. On the other hand, it draws to our attention the necessity of fully evaluating the devastating load that may be visited upon already incapacitated kidneys by the changes arising from urinary retention. Every man over fifty, particularly if he shows tendency to atherosclerosis, should have his prostate kept under surveillance.

In this group fall the late carcinomas of the stomach. It is easy to see, in reviewing a series of these, that late vascular degeneration of the same type as mentioned above, has an extraordinary and vital influence upon operability, postoperative comeback, and surgical complications, and, as in surgery in general, some of the very keenest problems presented to the internist are those associated with a correct estimate of cardiac capacity in the presence of the obvious changes known to be correlated with, and back of, the various grades of fibrosis. Little experience is needed to impress the great difficulties involved in giving a *prognosis*, not only in angina pectoris but in the many other less dramatic syndromes in which regional discomfort as well as pathologic inference demands at least an approximation of cardiac capacity. Here is a big and vital field where pathologists and clinicians "do not think in each other's language," even though they attempt a common tongue.

SOME PITFALLS IN CLINICAL PATHOLOGY

The pathologist has never maintained that his province is within the confines of the dead-house. Unfortunately, and all too often, when he has been led therefrom into the more benign effulgence of clinical experience, he becomes a clinician, and often is classed among our best internists. However, if the dark places in our professional work are to be lighted up, it is vastly to everyone's advantage that arrangements be made whereby the pathologist may still hold to his original field, cultivate adeptness, as well as familiarity with this province, and continue in it. What we should aim to do is to give him the aid in knowing of and understanding clinical concepts and sequences, in something of the same degree that we so eagerly urge him to unburden upon us his findings, his hypotheses and prognostications.

It can easily be shown that pathologists are constantly being called upon to make differentiations at a *set time* or stage of development in a disease process, where such a differentiation is quite impossible. How can he know that, unless he abandons the conviction (instilled into many by their early training) that the microscope is only an amplification of inspection, and that it need not err as to what is actually present, but it may obviously and frequently err when it is made all too encompassing, and the interpreter reads into it the rest of the cross-word puzzle, because he knows a few of the letters involved!

GOITER CLASSIFICATION AS AN EXAMPLE

The Mayo Clinic classification as given by Boothby (1922) may be contrasted with the classification of Charles A. Elliott, Northwestern University, Chicago.*

Mayo Clinic—1922

(1) Colloid adolescent goiter
(2) Adenomatous goiter—non-toxic
(3) Toxic adenoma
(4) Exophthalmic goiter
(5) Thyroiditis (including tuberculosis)
(6) Carcinoma of thyroid
(7) Secondary hypothyroidism
(8) Myxedema

*Given at the clinical session of the Interstate Assembly, Milwaukee, Wis., Oct. 31, 1924.

Chas. A. Elliott—Chicago

(1) Physiologic hypertrophy
(2) Endemic goiter
(3) Non-toxic goiter
    (a) Persistent physiological
    (b) Colloid
    (c) Fetal adenoma
    (d) Cysts
    (e) Neoplasm
(4) Toxic goiter (any of the above that are overactive)
(5) Exophthalmic goiter

Tribute should be paid to the great advantage that has accrued from an attempt at goiter classification. No logical attacks on the goiter problem, either as to diagnosis, therapy or prognosis, nor any enlightened education of the public, can be carried on without some such means of dividing goiter up into its groups. However, are we at all sure that the *pathology* underlying these different cases is much more than an approximation? The closest students of goiter problems are those who would probably admit that none of such classifications will endure for very long. They represent at the most the best current opinion of the time in which they are made. Discrepancies occur between the histologic pathology shown in goiters removed, and that usually discussed in the literature as being either the accompaniment or the cause of toxicity.

It might be stated briefly that controversy (if we admit that it does exist) centers chiefly about Classification No. 4 in Elliott's grouping, and whether "exophthalmic goiter" is a clinical syndrome of unknown or at least undetermined ultimate etiology, or a syndrome based upon more or less definite and constant tissue change within the thyroid itself. In any case, this is not so much an appeal or demand for an absolute etiology, which (in the present state of our knowledge) is not to be expected, but rather to focus our attention upon goiter classifications, and maintain that while the clinician and the pathologist have tried to function as co-ordinately in this field as any common situation with which most of us are forced to deal, nevertheless, "the exceptions in pathology noted" are becoming too frequent to be ignored. Many surgeons are removing goiters for toxicity that show no evidence of adenoma in any stage, and in which the most extensive search, with numerous sections, fails to show convincing evidence either of hyperplasia, round-cell massing or infiltration, or any of the other so-called Basedow imprints.

Careful students of goiter are coming to doubt whether there is the definite distinction in type and quality of the toxicity incidental to perverted secretion from adenoma in the thyroid, or from the rest of the gland, as in Graves' disease. Lahey* appears to feel, as does Biedl, that it is a question of degree and intensity of toxins rather than any essential structural difference.

Attention may be drawn to the types of operative reactions seen in exophthalmic goiters where the diagnosis could not be well questioned.

(a) A young girl of nineteen had this type ingrafted upon an adolescent colloid goiter of seven years' duration. Lugol's solution may have benefited the patient constitutionally, but it did not change the pulse rate notably. Rest in bed, tonsillectomy, et cetera, brought down the basal metabolism from nearly 100 to 36 plus. Despite definite exophthalmos, one searched in this gland in many areas, but without success, to find anything except the ordinary overfilling of colloid. Here and there there was some round cell infiltration. She bordered some on the neuro-circulatory-asthenia type, and the post-operative pulse reaction was very startling. Even so, there was not the raging overheating or the leaky, sweaty skin. She reacted very well, but one can predict that she will recover her general balance rather slowly.

(b) In contrast, a patient ten years older, with goiter formation and evident toxicity occurring synchronously, is very much benefited by the exhibition of Lugol's, and has a very slight post-operative reaction. Her gland shows on tissue section exquisite hyperplasia and papillary indentations of the follicles, etc. She has not been sick long, and will do well after operation.

(c) Then, an individual of about the same age and the same type of goiter, and treated in exactly the same manner, with a preliminary ligation to give additional security, has an explosive post-operative reaction, accompanied with a leaking of the pores of the skin—almost unbelievable—with associated pulmonary, tracheal and laryngeal edema, that rapidly proved fatal.

The histology of the thyroid tissue does not as yet explain these clinical differences.

*Surgical Clinics of North America, Vol. IV, No. 6.

OUR PROBLEMS IN LYMPH GLAND AND HEMATOLOGICAL DISORDERS

CASE 1: An instance of a female, aged 48, who died of the complete picture of pernicious anemia.

She had an associated splenomegaly for the last two and one-half months of her life. It is very striking to note that this patient had sufficient anemia to make her very uncomfortable for fully fourteen years. This is an uncommonly long time, and makes us loath to ever exclude pernicious anemia simply on a basis of the length of time involved. Suffice it to say that she did not have syphilis, Banti's disease, tuberculosis, or intestinal parasites. Slowly and insidiously the full clinical picture developed, and the course of the disease ultimately established the diagnosis.

CASE 2: A male, aged 35, seen first June 17, 1919. An enlargement of the glands of the neck was diagnosed by us as Hodgkin's disease. This diagnosis was changed after a biopsy had been made at another clinic August 29, 1919. A letter from their pathologist states, "To me this is the typical histological picture of lymphosarcoma. Personally, I am of the opinion that lymphosarcoma and Hodgkin's disease are the same condition, the latter being the fibrous stage of the former, etc." Naturally, the man had plenty of roentgen treatment. By March, 1922, attendants at the Michael Reese in Chicago reported that the man had lymphatic leukemia, with a leucocyte count of 31,000. By June, 1924, he had come to the well known authority on Hodgkin's disease, Dr. J. L. Yates, of Milwaukee. A letter from him indicated this opinion: "According to our estimate, this man has never had lymphosarcoma, but was suffering from an aleukemic leukemia type of Hodgkin's disease." Suffice it to say that he died with the leukocyte count ever mounting higher.

Our records show, as does the literature, that this changing about and intermixture of entities involving lymph glands that are supposed to be definite and fixed is by no means rare. It should, for one thing, teach the pathologist, in making biopsies on lymph glands, to watch his step; to the hematologist these instances should cause him to safeguard his reputation by limiting the domain of his opinion. It should teach us all *to study the clinical course of all disease through its entire period.*

CASE 3. A girl, aged 11, sick about one year. For the obvious enlarged cervical glands (bilateral) she had the usual tonsillectomy and adenoidectomy. The glands were soon after somewhat reduced in size. Thereafter, roentgen and quartz-lamp therapy was tried, with considerable benefit. Finally, eight months after the beginning of her trouble, a surgeon removed the glands from both sides of the neck. Thereafter the pathologists, where this tissue was removed, were evidently in doubt—some thought that the glands were tuberculous; some did not think so.

When seen recently, the clinical course has most certainly been that of Hodgkin's disease, with beginning secondary anemia, pressure pain—involving the ears and the Eustachian tubes—but as yet, the patient has no other obvious lymph gland involvement. This improvement under various forms of treatment is characteristic of Hodgkin's disease. With tuberculous glands of the neck becoming something of a rarity, clinicians and pathologists should both be cautions in diagnosing tuberculous cervical adenitis.

CASE 4. A woman, aged 52, presented herself with a pathological fracture of the left humerus. Roentgen studies soon showed multiple bone tumors. One of these, curetted out, was pronounced by the pathologist, "sarcoma"—but he did it with a reservation!

This patient ultimately came to autopsy, and was a definite instance of multiple myeloma.

Lympho-Sarcoma	Chloroma	Myeloma	Leukemia	Hodgkins	
+	2+	3+	+	+	Bone Tumor Formation
2+	0 (+)	0 (+)	+	+	Visceral Tumor Formation
2+	0 +	0	2+	2+	Lymph Gland Enlargement
(+)	0 +	0	+	+	Mic. Picture of Glands
0 (+)	+	+	0 (+)	0 (+)	Mic. Picture of Bone Tumors
(+)	3+	2+	+	+	Gross Character of Bone Tumors
0	+	0	+	0	General Blood Picture
0	+	0	0	0	Exophthalmos
Any Age	Young-Under 25	Over 40	Middle Life	Majority are young	Age Incidence
Acute + Fatal	Chronic Prog. Fatal	Chronic Prog. Fatal	Chronic Rem.-Fatal	Chronic Rem.-Fatal	Progress + Course
May or may not improve	Not improved	Not improved	Improved by Treatment	Improved by Treatment	X-Ray Features

Closely Related Disease Entities
(Microscope alone usually indeterminate) J.R. Kuth

We are indebted to Dr. J. R. Kuth for making a rather intensive study of the literature from the standpoint of the conditions associated with primary or secondary bone tumors. A copy of his chart is here presented, and will quite explain itself. In a few words, it teaches the fallacy of attempting differentiation based solely upon tissue microscopy or the elements seen in blood smears. Naturally, these different so-called "disease entities" are related. We may say that all febrile diseases have points of similarity, but that doesn't mean that we are unable to verify the various types even where etiology is unknown. Accordingly, this chart shows the necessity of correlating all the evidence, and here again the pathologist will continue to muddle along with the misunderstanding and mystery surrounding what is meant by sarcoma, until the most intensive correlated clinical and pathological studies are made.*

*See reference on next page.

Finally, reference may be made to Phemister's classification of malignant bone tumors. It is obvious that both the microscope and the roentgen film simply enlarge and extend our faculties and facilities for inspection. In this fact, the manner of bone resorption or deposition, its characteristic alignment and the evidence of osteogenetic tissue in the metastases—pulmonary and otherwise—furnish data that is possibly more convincing even than any biopsy could provide with the aid of the microscope.

These illustrations might be multiplied almost indefinitely. In characteristic cases a very large niche in the lesser curvature of the stomach indicates a carcinomatous ulcer. A microscopic section through the entire wall of this ulcer could tell you no more. Therefore the roentgenologist is also a pathologist—none of us can evade the issue.

This general review is given, as mentioned in the beginning, to in no way belittle the efforts or work of pathologists. Neither is it to suggest that each and every specialist and practitioner should be "his own pathologist." Rather is it to safeguard, direct and unify our combined efforts, not only for the benefit of each and every current patient, but for the further elaboration and perfection of medical science as a whole. Ways and means must be devised to keep good progressive, alert and intensive men in pathology. Disease must be studied throughout its entire course. It would appear that we have within a harmonizing of clinical and pathological efforts an excellent field, promising much that is instructive, as well as applicable, in the working out of our daily problems.

*We need only refer here to the splendid work that is being done by the standardizing committee which is presently said to be about ready to report on this very vital matter, and has already passed out to different teaching institutions a preliminary differentiation more logically based than any we have had up to date.

THE PHLORHIZIN TEST IN THE DIAGNOSIS OF PREGNANCY

The test is made by injecting 0.002 gm. of phlorhizin into the gluteal muscles of the patient, who has been fasting. The patient drinks 200 c.c. of water. Immediate test of the urine for sugar serves as a control. Six specimens of urine are examined, at fifteen-minute intervals, for glycosuria. If glycosuria is provoked, the test is reported as positive; otherwise, negative. Reports on the reliability of the test are conflicting. *(Jour. A. M. A., Apr. 25, 1925, p. 1292.)*

OBSERVATIONS CONCERNING OBESITY WITH REPORT OF CASES OF ENDOGENOUS TYPE*

C. A. McKinlay, M.D.
Minneapolis

According to Tileston,[1] obesity may be considered to be present when the body weight is 15 per cent or more above the average for the given height and age. The maintenance of constant body weight is, indeed, a remarkable physiological fact when it is considered that slight continued variation in food intake or exercise may profoundly affect it. In an instance of maintenance of the body weight for twenty years, noted by DuBois,[2] the total food intake corresponds to the expenditure of energy with an error of only .05 of 1 per cent. DuBois also gives the instance of a man whose gain in weight of 75 kilos in twenty years, expressed in terms of energy intake and expenditure, showed that he had eaten only 11 grams or one small butter ball too much, or walked at a slow rate one and one-third miles too little, daily. With this exogenous type of obesity due to disproportion between food intake and energy output we are not especially concerned in this paper, but rather with endogenous obesity.

This latter term has been defined as obesity due, not simply to overnutrition or underexertion, but to the involvement of one or more endocrine glands. We should not assume, however, that a sharp line can be drawn between all cases because clinical observations indicate a blending of types. Lyons[3] stresses this blending in his study of clinical groups of fatty deposit including Dercum's disease, simple obesity, Frölich's syndrome and other types of lipomatosis. He insists that they are all essentially identical and are only variations of a common morbid process. Lyons considers that the pathological findings and the general evidence suggest the view that the process is due to alteration in the glands of internal secretion. Faber[4] mentions that caloric intake must be adjusted in cases of the endogenous, as well as of the exogenous type. He suggests that superfluous calories throw an added task on the organs which regulate the oxidative processes of the body. If they are

*From the Department of Medicine, University of Minnesota. Read before the Hennepin County Medical Society, Minneapolis, February 2, 1925.

unequal to this task, the superfluous nourishment is deposited as fat. The metabolic anomaly in this endogenous obesity may not affect the basal metabolism, but thyroid treatment may stimulate the organs involved and lead to throwing off of the fat deposits. Dubois[5] suggests as a possibility that simple obesity may be the only manifestation of an endocrine dysfunction which in more marked cases shows demonstrable physical stigmata of pituitary or other disease.

No more valuable study on obesity has appeared recently than that of Grafe[6] on the constitutional or endogenous type. Grafe is inclined to believe that the endocrine factor is chiefly the thyroid gland, since he and Eckstein found that the luxury consumption of energy accompanying overfeeding depends upon the presence of this gland. They found in animal experimentation that when the thyroid gland was removed there was not the increase in metabolism after food intake which is normally present. The absence of obesity following castration or in eunuchoidism he thought to be due to compensatory hyperfunction of the thyroid. The thyroid influence in this type of endogenous obesity may not be indicated by any alteration of the basal metabolism, since it is considered by Grafe to be within normal limits in a majority of cases when modern surface area formulas are used. This is in keeping with Means'[7] observations that a majority of obese patients show no alteration in the basal metabolism, but that a slight reduction may be found in subjects with frank evidence of endocrine disease. Grafe lays great importance upon the reduced specific dynamic reaction found in obesity. Plaut[8] found in the obese abnormally small increase of metabolism after food intake. In contrast, she found a very marked rise of metabolism in the opposite type of persons, those with constitutional thinness, whose weight remains low no matter how much they eat.

Wang and Strouse[9] have recently reported the results of their study on twelve obese subjects and found that they showed a lowered specific dynamic reaction after food intake, particularly protein, and they noted an opposite effect in thin individuals. These observers found that neither excessive underweight nor overweight is associated with a constant change in the basal metabolism.

The endogenous type of obesity, however wide may be its inclusion of other types, may, according to Barker,[10] be divided into the three main groups of hypothyroidism, hypopituitarism and hypogenitalism. To these may be added the obesity found with tumors of the pineal and adrenal glands, also adiposis-dolorosa. Two cases classified as endogenous obesity are reported in this paper in some detail. Justification for the report of the first case may be found in what has been considered a conclusive demonstration of a change in thyroid function from hyperactivity to normal or retarded activity with onset of obesity.

CASE REPORT

Case 1. Mrs. T. L., aged 33, came under observation May 15, 1923, complaining of palpitation and nervousness. The present illness began six years previously in 1917, and was characterized by weakness, palpitation, distention of abdomen, and loss of weight. Nervousness consisted of a sense of suffocation, tremors, and excitability caused chiefly by the presence of crowds or by some unusual circumstance, rather than by any physical exertion. Loss of weight amounted to about 30 pounds. The appetite remained good. After three months the patient began to gain weight with subsidence of symptoms. About two years later a similar attack occurred with another period of loss of weight extending over a period of a few months. Since then the patient has not been symptom-free except for short intervals of one to two months. Six weeks before observation there was increased weakness and aggravation of nervous symptoms.

Throughout the periods of complaint the patient has had a remarkably good appetite. From statements obtained from the patient and her husband of the amount of carbohydrate food eaten, the estimated daily food intake has been about 4000 calories. This fact has been of diagnostic value. The family history was unimportant. The past history by systems showed nothing important except that eleven years previously the patient suffered from an illness with symptoms similar to those described above, including weight loss and with recovery in four to five months. Dysmenorrhea has always been present with scanty flow and irregularity. Patient has been married seven years and has never been pregnant.

Physical examination showed a well developed and well nourished woman, weighing 130 pounds. The skin and hair were normal. Examination of chest and abdomen was negative. The heart rate was not accelerated. There was no exophthalmos or lid lag, and the pupils were active and equal. The isthmus of the thyroid was slightly enlarged. No thrill or bruit was present. Slight tremor of the hands was noted. The patient was mentally alert but was neither emotional nor excitable during the examination. The laboratory data added nothing of importance except that the basal metabolism was persistently above normal, varying from plus 20 to plus 38, averaging plus 28. A diagnosis of exophthalmic goiter was made. During the next three months the patient received three *x*-ray exposures over the thyroid gland. Following this she had a remission of symptoms, entire absence of palpitation and

a return of her metabolism to normal. Her menstruation also became normal. Except for a period of two or three weeks in November, 1923, the patient had relief from symptoms for a period of sixteen months. When seen in December, 1924, the patient showed a weight gain of 40 pounds but no signs of myxedema. The skin was normal and there were no fat pads above the clavicles.

In spite of the increased weight, there was the remarkable drop in food intake from an estimate of 4000 calories to one of 2500 daily, certainly no more. At the same time the basal metabolism was normal, reading plus 1 per cent.

The history of this patient might indicate a functional neurosis and that alone. Palpitation, breathlessness not caused by exercise, and a sense of suffocation when in a crowd, all might point that way. Back of an equivocal history, however, as far as nervous and mental reactions are concerned, stand out certain other facts of primary importance. First, a history of good health until 18 years of age. Second, absence of evidence of infection. Third, increased basal metabolism. Fourth, association of symptoms of exhaustion, palpitation, excitability, and irritability, with weight loss and increased appetite and food intake. Fifth, period of gain of weight amounting to slight obesity after retardation of thyroid function following irradiation. Sixth, remarkable alleviation of dysmenorrhea following the above mentioned alteration in thyroid function. Seventh, gain of weight with lessened food intake. Eighth, remittent character of illness. One remission we have observed following *x*-ray treatment with a fall of the basal metabolism to normal. Very significantly this gain in weight has occurred with the presence of decreased food intake, which may be fairly considered to be characteristic of the altered metabolism of thyroid disease.

We have considered that there is evidence of periods of disturbed thyroid function extending over several years; that the first phases were those of hyperactivity followed by retardation not amounting to myxedema. We have also interpreted as possible evidence of glandular interrelationship the alteration in menstrual function with decreased thyroid activity. Aside from demonstrated changes in the basal metabolism of this patient there has been the marked evidence of nutritional change as illustrated by the caloric intake and weight chart. As the patient has been entirely comfortable, no treatment of obesity has been attempted.

A graphic representation of the thyroid function is here presented which up to the first time of observation is entirely diagrammatic and has been reconstructed from history alone, interpreted in the light of the data later obtained through observation of the patient.

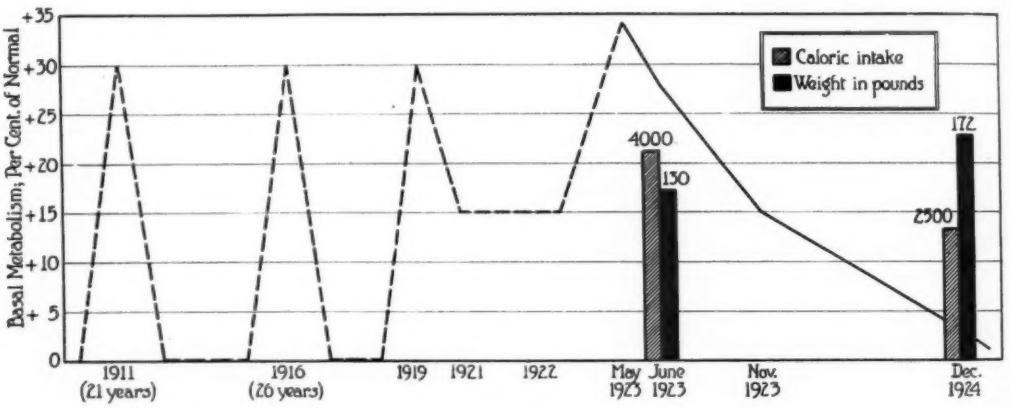

Fig. 1. Dotted line: Diagram to represent periods of hyperthyroidism reconstructed from history alone. Solid line: Basal metabolism under observation. Change of relation of food intake to weight is shown with alteration of thyroid function. Case 1.

Case 2. E. B., white, female, single, aged 18. The patient entered the University Hospital August 3, 1921, complaining of obesity. Photographs indicated that obesity started at about the age of three years. The gain in weight had been continuous. Though inconvenienced in getting about and troubled with slight shortness of breath, the patient had felt well. Her appetite was normal and, according to her statement, she ate no more than other members of her family. Her greatest weight had been 346 pounds. The menstrual history was normal. The past history was unimportant. The family history revealed two aunts with obesity.

Examination showed a very obese girl weighing 318 pounds. This distribution of fatty tissue was fairly uniform although it appeared to be relatively greater through the shoulder and pelvic girdles. The fat was neither nodular nor painful. Skeletal growth appeared normal. There was no unusual distribution of hair or pigmentation of the skin. The viscera were normal. The eye grounds were normal. The laboratory data, which were all normal, included urinalysis, blood count, sugar tolerance, blood sugar, urea, and creatinin, and negative Wassermann. The basal metabolism varied from −12 to −20 per cent. By *x*-ray, the sella turcica appeared large though within normal limits. The patient was placed on a 1200 calorie diet and given anterior pituitary substance (3 grains daily). Weight loss in 30 days amounted to 15 pounds.

The patient came under observation again in November, 1923, showing slight increase in weight. At this time she was given 800 calorie diet and thyroid extract (grs. 2, twice daily). In ten weeks her weight dropped from 326 pounds to 263. The basal metabolism remained normal and showed no marked change.

The features of this case that attract our attention are: first, the marked obesity which showed partial response to reduction of diet, proper exercise, and the use of anterior pituitary substance; second, the signs of anatomic changes in the sella turcica which might indicate pituitary disease, but which are inconclusive because of no supporting clinical evidence; and third, slight reduction of the basal metabolism below the limits of normal.

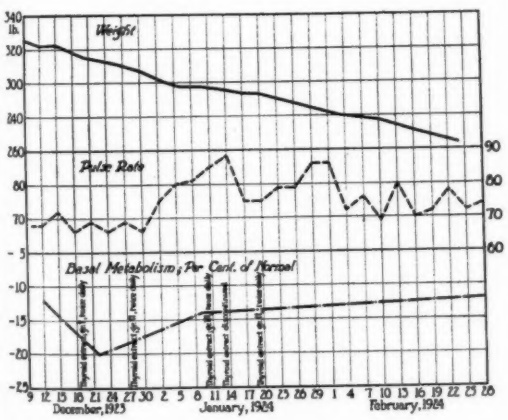

Fig. 2. Showing the pulse rate, basal metabolism, and loss of weight in pounds following the reduction of diet and the administration of thyroid extract. Case 2.

Considering the onset of obesity in early childhood, endogenous, possibly hypophyseal, origin has been suggested. It is known that obesity of that origin may be accompanied by a reduction in the heat production of the body. Such reduction may possibly be due to accompanying thyroid changes not uncommonly found in pituitary insufficiency. Cushing[11] found thyroid changes in all of fifteen such cases of pituitary insufficiency.

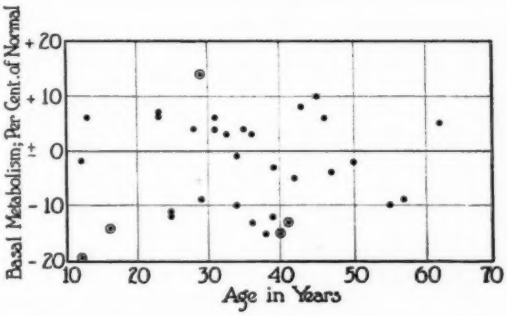

Fig. 3. Showing the basal metabolism of a series of 33 obese subjects. Dot in circle indicates endogenous type. All others were classified as simple obesity.

Sufficient indication for the use of thyroid extract was thought to exist. Two to four grains were given daily. The loss of sixty-three pounds attests the effectiveness of the treatment. The patient was more comfortable and developed no nervous or cardiac symptoms. The pulse rate showed no marked change, usually being below eighty. The patient has been observed since and weight has remained about 265 pounds. It should be kept in mind that this response was obtained by the combination of lowered food intake with thyroid extract.

A graphic representation of the basal metabolism of thirty-three obese subjects is shown in Figure 3. The series illustrates the increased frequency in females, there being only three males in the series. No extended analysis of this series is attempted. Mention is made of the information gained from the histories that the patients often dated the onset of obesity following pregnancy and in fewer instances following menopause. It is seen that obesity was associated with normal basal metabolism in over two-thirds of the cases and that, of nine patients with subnormal metabolism, four had some physical signs suggestive of endocrine dysfunction.

The obese patient that is alert and active and has a basal metabolism normal or at the upper limits of normal may be distinctly harmed by thyroid extract, the unfavorable reaction being indicated by onset of palpitation, tachycardia, and

nervousness. Loss of weight does not always result to the extent desired. If goiter is present, harm may be done by stimulating its activity. Indiscriminate use by the laity of weight reduction preparations is one source of such unfavorable reaction.

Any case of obesity which does not show a reduction of weight on a low calorie intake gives presumptive evidence of an endogenous factor. Although one or more endocrine glands may be involved, clinical evidence points strongly to dysfunction of the thyroid gland as the important factor. While other glandular preparations have been used, thyroid extract has given the best result.

Indications for thyroid therapy in obesity may be considered to be present in two groups of cases. First, with evidence of hypothyroidism, hypopituitarism, or hypogenitalism, thyroid extract in addition to a corrective diet may quite constantly be expected to aid in weight reduction. Secondly, when frank evidence of endocrine disease is lacking, the disproportion between body weight and caloric intake and exercise suggests a lowered level of energy exchange in the body. This level of energy exchange may be increased by the addition of thyroid extract. Proper control of the patient includes observations for unusual nervous, cardiovascular, and digestive symptoms, and also determination of the basal metabolism. Too rapid weight loss should be avoided. As the water balance is not infrequently abnormal in endogenous obesity, accumulation of water in the tissues without edema may account in certain instances for the maintenance of body weight in the presence of lowered caloric intake. According to Grafe, thyroidectomized animals rapidly gain weight, due largely to retention of water. Loss of weight following thyroid extract may be due in large part to loss of water from the tissues. It may be suggested that more attention be paid by clinicians to water intake in obesity.

CONCLUSIONS

1. One case of endogenous obesity due to alteration of thyroid function is reported that illustrates a phase of the cyclic variation of thyroid function occasionally observed. Another case of endogenous obesity with lowered basal metabolism is reported which lost weight after the use of a low calorie diet and thyroid extract.

2. In the obese, lack of weight loss after lowered food intake and sufficient exercise suggests a rational basis, under proper control, which includes estimation of the heat production of the body, for the addition of the use of thyroid extract.

3. In a series of thirty-three cases of obesity, twenty-eight classified as simple and five as pituitary in origin, the basal metabolism was normal in twenty-three cases, above 10 per cent in nine, and below in nine. Signs of endocrine disease were found in four of the nine patients with subnormal basal metabolism.

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THE ALIMENTARY IMPLANTATION OF LACTOBACILLUS ACIDOPHILUS

Those who have followed the successive changes of view regarding the dietotherapeutic rôle of lactic acid-producing micro-organisms since the pioneer writings of Metchnikoff on this subject, must have wondered how any feature of it can have retained scientific stability. Claim after claim has been hastily set up, only to be abandoned after a short period. Yet the practical use of the types of bacteria here concerned somehow persists in one form or another with a pertinacity that challenges some attention. Recent investigations seem to indicate that the Bulgarian bacillus cannot be implanted in the human intestines. For this reason, doubt has been cast on any alleged physiologic action of this organism in the intestine.

Preference has latterly been given to Lactobacillus (Bacillus) acidophilus, based on claims of superior possibilities of alimentary implantation. Recent investigations give evidence that Lactobacillus bulgaricus differs from Lactobacillus acidophilus in the ability of the latter to live in the intestinal tract. *(Jour. A. M. A., Apr. 25, 1925, p. 1277.)*

BLADDER DIVERTICULA: REPORT OF TWO CASES*

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Perhaps the most concise as well as complete definition of a vesical diverticulum is that of Kelly and Burnam, who describe it as a "congenital pocket, loculus or sac of variable size, communicating with the cavity proper of the bladder, attached to its periphery, and lying below or at one side of, posterior to, or above the bladder." The opening between the diverticulum and the bladder varies from a wide mouth to a narrow sinus.

Englisch has attempted to classify these outpouchings into two groups: (1) Those in which the wall of the diverticulum is comprised of mucosa and a true musculature; (2) those whose walls consist entirely of mucosa.

In a general way the diverticula of the first group are congenital, whereas those of the second group are acquired. According to Voelcker some cases which result from perforation of perivesical abscesses into the bladder are classified as diverticula, and such false diverticula, as he terms them, are necessarily not lined by mucous membrane.

According to Judd and Scholl, bladder diverticula are probably due to embryologic defects in the bladder, either a weakening of the musculature or a definite hiatus in the wall of the bladder. Perhaps the simplest explanation is that of Kelly, which holds that diverticula are usually formed from small pre-existing pouches or herniae in the bladder which become enlarged by pressure and later make themselves known through stagnation of urine, stone or neoplasm formation, or by pressure symptoms on a ureter.

Hodgson in 1857 recognized that a common cause of diverticula was to be found in a prostatic or a urethral obstruction, giving us at this early date a practical explanation for the fact that diverticula in women are uncommon. At the Mayo Clinic a five months' embryo was observed to have definite diverticula in the region of each ureteral orifice. Lennander has reported a case in an infant, age twenty-one months, in whom the exciting cause was urethral obstruction due to phimosis. The German school believed that one could determine whether or not a diverticulum was congenital or acquired by an examination of the diverticular wall. The congenital type was supposed to contain all the layers of the bladder wall, whereas the acquired had a wall consisting only of fibrous tissue covered with epithelium. This classification and differentiation does not work out practically, since pathological conditions within the sac may entirely destroy the epithelial lining and even the musculature.

Crosbie states that his microscopic examination of the walls showed sometimes pavement epithelium, usually fibrous tissue with only scattered smooth muscle fibers, and in no place could muscle bundles be seen. He feels certain that all diverticula are congenital and that they are discovered when they produce symptoms of obstruction or infection, or both. The puckered opening into the diverticulum is so distinct and so different from the appearance of a trabeculated bladder that it does not seem possible that one of these small pouches can enlarge and become a true diverticulum.

Symptoms resulting from the presence of diverticula depend upon their size, location, and multiplicity. There are undoubtedly many diverticula which produce no symptoms; this has been demonstrated frequently by postmortem examination of patients dying of other conditions. Individuals with symptoms suffer much discomfort, and the diverticulum may become not only a menace to health, but also to life. The subjective symptoms are often obscure and many cases have nothing more than pain and difficulty in urination. Sometimes the patient may urinate and after emptying the bladder is obliged to urinate again after a short time. A symptom which has been described is the passage of clear urine without pus followed immediately by a considerable amount of urine containing a great amount of pus, the latter being urine from the diverticulum. This sign is, however, unusual in my opinion, because practically all of these cases have infected bladders, the urine frequently being putrid and loaded with pus, and also because the diverticulum, being inelastic, cannot empty itself.

The diagnosis of vesical diverticulum is very often made in the course of a cystoscopic examination made for other conditions and it is only since this instrument has come into common use that a large number of cases have been observed

*Read before the Ramsey County Medical Society, St. Paul, March 30, 1925.

and accurately diagnosed. The cystoscopic picture in the typical case is quite characteristic, namely, the presence of a dark spot of lesser or greater size in the wall of the bladder mucosa. The presence of numerous dark spots in the bladder wall would lead one to suspect multiple diverticula. It is easy to mistake a dilated ureteral orifice for a diverticular opening, but this condition can be easily differentiated by cystograms, ureteral catheterization and ureterograms. A practical point during the course of a cystoscopic examination is to insert a ureteral catheter into the dark spot, or, even better, to insert a lead catheter, following this by radiographic examination. I have frequently observed, on withdrawal of the catheter from the diverticulum, a considerable amount of flocculent pus pouring out from the infected sac. The examiner should be very cautious not to misinterpret certain cystoscopic findings in a normal bladder for vesical diverticula. We have seen cases in which there existed traction on the fundus or lateral walls of the bladder due to pelvic inflammatory processes or previous operations which upon cystoscopic examination gave the impression of a diverticulum. The use of the ureteral catheter and of the cystogram established the proper diagnosis at once.

There are certain areas in the bladder where diverticula are most apt to be found. The most common site, as first noted by Pagenstecher, is in the lateral wall in close approximation to the ureteral orifices. As above noted the cystogram is of great importance in making the diagnosis and radiographs should be taken in various positions in order that a better idea of the size and exact location of the diverticulum may be determined.

Dr. W. Lerche published in 1912 an ingenious method for introducing a rubber bag filled with boric solution to determine the size of the diverticulum; he likewise used this bag to distend the diverticulum at the time of operation.

Papilloma, carcinoma, angioma, and concretions have been found in cases reported. Pressure on the ureters may result in hydronephrosis and pyonephrosis. Acute inflammation, gangrene, and even perforation of the diverticular sac have been observed and described.

Just a few words regarding the incidence of diverticula. From 1894 to 1923, 133 cases of diverticula of the bladder were treated surgically at the Mayo Clinic. Ninety of the patients or 67.6 per cent had multiple diverticula, seventeen had two, ten had three, six had four, and in ten the number was not determined.

At the Mayo Clinic from 1907 to 1920, twenty-eight patients or 12.1 per cent had coincident calculus and diverticulum of the bladder. Hinman in twelve of the 205 collected cases found the ureter involved. In 1910 Fischer collected forty-eight cases with twenty-eight cases operated; 8, or 40 per cent, died. In 1922 Kneise and Schulz collected thirty-five cases from the German literature and added eighteen of their own, where radical operation was performed. The mortality was 7.7 per cent. Blum recently published a monograph reporting thirty-two cases in which he had performed a complete extirpation of the sac. He does not, however, give his mortality statistics in this series.

Various methods of treatment have been attempted for the cure of this condition:

1. None at all where the condition provokes no trouble.

2. Palliative treatment by irrigation and sterilization of the bladder in those who are too old, ill, or feeble to withstand any operation.

3. Incision of the orifice leading into the diverticulum, thus making it a part of the bladder.

4. Excision of the mucous lining in the pocket with denudation, suture and closure of the margin of the orifice.

5. Extirpation of the diverticular sac and when necessary transplantation of a ureter, or if the ureter enters near the base of the diverticulum the Young flap operation.

Various types of operation have been devised, but the most successful and safest is the complete extra-peritoneal excision of the sac of the diverticulum. The transperitoneal route carries with it too much danger of peritonitis. The sacral route has been attempted for the diverticula in the posterior wall of the bladder, but it is difficult to secure adequate exposure by this method. As in all other surgical conditions, the operative procedure depends greatly upon the condition of the patient, and, as Kelley so well puts it, something of that imponderable factor called "vitality" must be known. The exact condition of the urethra, bladder, ureters, and both kidneys must be determined if possible. In the presence of a stricture or hypertrophied prostate, it may become necessary to remove the lower obstruction and to drain the blad-

der as a preliminary step. In fact it is sometimes wise in the presence of a severely infected bladder to drain it suprapubically as a preliminary step. In cases where the patient's condition is poor, where it is extremely difficult to free the diverticulum, one may remove as much of the fundus as possible and insert a drain in the diverticulum outside the bladder. Then, working inside the bladder, the edges are denuded and sutured. In this way drainage of the diverticulum is obtained and there is a possibility of obliterating it entirely.

Lower-Calot technique: an incision is made from the pubes to the umbilicus down to the bladder, which has been previously filled with a solution. The bladder is then mobilized, especially laterally. Then the bladder is opened and the openings of the diverticulum made out and explored. Ureteral catheters are then passed and left in during the operation. The diverticulum is packed with gauze and is freed outside of the bladder by blunt dissection usually with the fingers. To free the last tissue about the neck of the diverticulum, it is best to remove the gauze and evert as much as possible of the diverticulum into the bladder and then work with the fingers outside the bladder and the thumb inside of the bladder at the outlet of the diverticulum, grasping the wall of the diverticulum between the thumb and forefingers. In this way the adhesions are freed. When the diverticulum is entirely freed, it is excised at the neck and the cut edges brought together with chromic catgut sutures. The bladder is closed with a suprapubic tube left in and a rubber drain placed outside the bladder to the site of the diverticulum.

Case 1.—Mr. J. H. Age 45. July 15, 1924.

Present Complaint.—Bleeding from urethra, pain over bladder, frequency, burning on urination, dribbling, bloody urine.

Present Illness.—First began to bleed from urethra about two years ago. This came on very suddenly with pain in the bladder region. No pain in the back or down the legs. Second hemorrhage followed about eleven months after the first. Present hemorrhage (third) began July 14, 1924, and he was admitted to the hospital at once.

Past Illness.—Varicose veins of right leg removed two years ago. Has been under the care of a physician for two years or more and during this time was being treated for a chronic cystitis by catheterization and bladder irrigation. Never well during this time but seemed to improve a little now and then with frequent setbacks, accompanied by increased frequency, dribbling, and burning urination with urine usually cloudy.

Examination.—Patient was seen in hospital in consultation with Dr. Max Hoffman. Urine: acid, sp. gr., 1023; albumin, 4 plus; r.b.c., 4 plus; leucocytes, plus; pus, plus; sugar, negative. Blood: hemoglobin, 78 per cent; r.b.c., 3,840,000; coagulation time, five minutes. Temperature and pulse normal. B.P., 112/90. Patient was found to be in considerable pain, restless, anemic in appearance, and skin very clammy. X-ray of the bladder advised. X-ray of bladder revealed two large walnut-sized stones, and about twenty-five smaller ones, apparently in the prostate area. Because of considerable amount of bleeding, cystoscopic examination was not thought advisable.

Operation.—Suprapubic cystotomy. The bladder was first irrigated with boric acid, but no attempt was made to wash out the many clots present. The bladder was distended with boric acid solution and incision made in mid-line. The bladder wall obtained and anchored with linen sutures held by forceps. Upon entering, the bladder was found to contain numerous blood clots, all of recent origin. Two large stones were found free in the bladder. The *x*-ray revealed other stones, but they were not found in the bladder proper. Upon further exploration, with assistant's finger in the rectum, we found a sac or pocket to the right lateral side of the prostate. The assistant was able to feel other stones with the finger in the rectum. An incision was made broadening the opening found in the bladder to the diverticulum and the stones removed. On account of the poor condition of the patient and the location of the diverticulum it was thought not advisable to attempt to remove the sac. The neck of the sac was cauterized with hot irons, the finger in the rectum acting as a guide. A suprapubic drain was placed in the bladder and the bladder walls were sewed with chromic No. 9 and three silk worms, equstine being used for skin. Uneventful recovery followed until August 7, 1924, when the patient developed a thrombosis of some varicose veins of the left leg. They were removed at a later operation.

Progress.—Patient gained rapidly and has been feeling well ever since.

Case 2.—Mr. H. N. Age 75. April, 1923.

Present Complaint.—Considerable trouble in passing urine for the past two years, frequency of urination, and all signs of retention.

Present Illness.—He had had repeated bladder irrigations for cystitis a year previously. Following these irrigations he improved considerably and gained in weight. For about six months he irrigated himself at home twice a week. In March, 1923, he began to have considerable urinary trouble. On August 15, 1923, he was sent to the hospital for examination, complaining of dribbling, frequency, and considerable amount of pain on urination. He had to be catheterized three times a day.

Past history is negative with the exception of a neisserian infection at twenty-one. The patient has never had an adequate stream since he was thirty-five years old.

Physical examination showed a man underweight, anemic, and with clammy skin. Development and nourishment were only fair. He complained of much pain in the lower abdomen and a constant desire to urinate. Head, neck and chest were normal. The patient had two large indirect inguinal herniæ. The hernia on the right side was considerably

larger than that on the left and bulged down into the scrotum. The penis showed an embryological defect, the meatus being on the ventral surface of the glans. Neurological examination failed to show any abnormality. The prostate was small and hard.

Urine examination, acid, 1020; leucocytes and pus, one plus; trace of albumin.

Examination with sounds revealed the presence of a marked stricture just anterior to the prostatic urethra. Soft rubber catheters could not be inserted. For two months sounds were passed until a Fr. 28 could be inserted. The patient was then instructed to irrigate the bladder with boric acid and at various times mercurochrome.

A cystoscopic examination was made on July 10, 1923, at which time a distinct band was observed in the region of the prostate. The patient's sysptoms having become more severe, it was decided to perform a suprapubic cystotomy. October 18, 1923, the bladder was opened and a band-like process in the internal meatus was excised. The bladder wall showed much trabeculation, but at this time we did not explore the fundus and lateral walls because of the weakened condition of the patient.

The operative recovery was uneventful and before leaving the hospital the patient felt considerably improved. There was still a retention of about three or four ounces.

I have seen this patient about once a week since the operation, and his condition has remained practically the same.

OPERATIONS IN ABSENTIA

A French surgeon attached to the St. Louis Hospital in Paris has invented a new device whereby medical students in an adjoining lecture-room may observe every detail of an operation without disturbing either the patient or the operator by their actual presence on the scene. An ingenious arrangement of lights and mirrors enables them to follow every movement of the operating surgeon, and for their convenience the whole picture is considerably enlarged. Moreover, a loud speaker carries to them the comments of the operating surgeon upon his work.

The new device, which has been named the episcope, is the invention of a young French physician, Dr. Thuillant. The St. Louis Hospital possesses the only one at present in use, but a second is being installed at the Ecole Dentaire. —*The Living Age*, Feb. 14, 1925.

Jealousy is not confined to opera-singers; you find it chiefly in soldiers and doctors. I think the only profession exempt from it, that I have encountered,—for what reason I do not know,—is the Bar.

Success affects men and women very differently. I have known a few who were improved by it; some made by it; but most get their heads turned and are ruined by it. I should much like to have experienced it—even for a short time—to know how it would have affected me; but I can affirm with truth that I have never been jealous of it. On the contrary I think life would be a drab place if we all walked the same pace, and I follow with joy every good thing that turns up for my friends.—MARGOT ASQUITH, *London Magazine*, December, 1924.

THE ADMINISTRATION OF NATURAL AND ARTIFICIAL SUNLIGHT IN PRIVATE PRACTICE* **

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Although heliotherapy was employed by physicians of ancient times it was on a purely empirical basis until recent years. Indeed, all the reasons for the excellent results obtained from heliotherapy even yet have not been satisfactorily explained. To my knowledge Rollier[1] was the first to place heliotherapy in the treatment of human disease upon a scientific basis. It was he who carefully regulated and graduated the dosage of the sun's rays for certain disease conditions. Most of his work has been done at high altitudes above the cloud line and for some time it was a question as to whether such excellent results could be obtained at lower altitudes. In America we are deeply indebted to the physicians working at the J. N. Adam Memorial Hospital at Perrysburg near Buffalo, New York, who have proved beyond question that high altitude is not essential to excellent results from heliotherapy. Moreover, light from the quartz mercury vapor lamp and light from an electric arc introduced by Finsen[2] may be available at all seasons of the year even in lands of little sunshine.

WHAT DO WE REALLY KNOW ABOUT THE ACTION OF SUNLIGHT?

We know that when properly administered sunlight has a beneficial effect upon patients suffering from certain diseases such as tuberculosis and rickets. Just how the benefit to the patient is accomplished was for a long time a subject of conjecture and much speculation. However, rather scientific investigations have provided us with considerable definite information. We know direct sunlight is a powerful bactericidal agent; we know also that rays from the quartz mercury vapor lamp have a bactericidal action. From the standpoint of preventive medicine these facts are of great significance.

Hume[3] pointed out that irradiation with the quartz mercury vapor lamp can prolong normal

*Read before the Hennepin County Medical Society, February 25, 1925.

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growth in rats on a diet almost free, or free, from vitamin A. She states "that the interplay in growth and rickets is the same, and the very existence of an interplay in both cases heightens the possibility that the two vitamin factors may be identical or nearly allied." Goldblatt and Soames[4] for the most part confirmed the work of Hume. These authors as well as Hume call attention to the fact that vitamin A may be stored in the animals' tissues. After conducting similar experiments Steenbock and Nelson[5] came to the conclusion that the continued growth in Hume's animals as well as in their own was due to vitamin A stored in the tissues. Moreover they believe that ultra-violet light cannot substitute for vitamin A, but can substitute for the antirachitic vitamin. With this thought in mind Steenbock and his co-workers[6,7,8] began experiments to determine whether in the absence of antirachitic vitamin "light may be an important factor entering into the production of normal growth and wellbeing of many of our domestic animals." From their first study, limited to chickens, they state that: "It is apparent from our data that light can play a very important part in the rearing of baby chicks, acting as a supplement or the equivalent to the antirachitic factor of foodstuffs." "From limited data it appears that one-half hour daily exposure to direct sunlight was much more potent in furnishing the antirachitic equivalent than was 5 per cent of a synthetic ration fed as fresh green clover, calculated on the basis of the dry weight of the clover." From their second study, limited to swine, they state that "Gross symptoms supported by chemical analysis of blood and bone as well as by histological evidence indicate that sunlight is a factor of economic importance in the production of pork under confined conditions in northern latitudes."

Hess[9] has recently shown that by exposing cottonseed oil to the rays from the quartz mercury vapor lamp for one hour the oil becomes endowed with antirachitic properties. He states that cottonseed oil so treated "frequently acquired a somewhat fishy odor resembling that of cod liver oil." "Naturally, one of the first things which suggests itself is the possible association of a phenomenon of this kind with vitamines."

Later after making a thoroughgoing study of this subject Steenbock and Daniels[9a] summarized the results of their work as follows:

"By exposing such food materials as wheat, rolled oats, corn, hominy, cream of wheat, shredded wheat biscuits, corn flakes, patent wheat flour, cornstarch, meat, milk and egg yolk to ultraviolet light, they can be endowed with rickets-preventing properties. That such a wide variety of foods can be thus affected appears to be due to the fact that practically all naturally occurring foods contain lipoidal constituents of the nature of sterols which can carry this activation. Cholesterol, for example, as obtained from brain is entirely inactive, but after exposure to ultraviolet light becomes rickets-preventing.

"As fats are good solvents for these lipoids, practically all fresh fats, such as butterfat, olive oil, lard, corn oil, coconut oil and cottonseed oil, can be activated, often to a degree to make them compare favorably with cod liver oil. As antirachitic action consists in the induction of calcium assimilation and its conservation for the animal, this is a matter which concerns not only the young but also the adult.

"It is suggested that these findings may have their significance not only in nutrition, but also in the therapy of those diseases known to respond to irradiation with ultraviolet light."

In 1919, Huldschinsky[10] proved beyond doubt that light is the important factor in the treatment of rickets. In addition to the use of natural sunlight he proceeded to use the quartz mercury vapor lamp with excellent results. Since that time Hess and his co-workers[11,12,13,14] as well as McCollum and his co-workers[15,16] have carried on many scientific investigations with experimental and clinical rickets. They have also found that this disease may be prevented as well as cured by exposures to sunlight or to rays from the quartz mercury vapor lamp. It has been found that where the blood calcium is decreased, the use of light rays soon results in a normal blood calcium content. Speaking of inorganic phosphate in the blood of children after careful analyses Hess[17] says, "This seasonal tide of the blood phosphate, the ebb in the winter, and steady rise to the flood of summer time, is to be attributed mainly to the seasonal variation of sunlight." In discussing the importance of light in the treatment of rickets, Hess[17] also says, "The question of etiological importance of light cannot be considered by itself, but must be surveyed in relation to reciprocal factors, of which the most important are diet, rate of growth, and pigmentation of the skin. Experiments on rats demonstrate that if the diet is markedly productive of rickets, long exposures to light are necessary to afford protection, whereas if the diet is less inadequate short exposures suffice. Various gradations of these two factors can be formulated at will. The same is true in relation to growth.

Numerous animal experiments could be cited to illustrate this point. For example: On the standard diet, a standard degree of light-raying of four minutes daily with the carbon arc at a distance of 3 feet will invariably protect against rickets. On this diet rats grow poorly. When it is amplified so as to lead to progressive and moderate growth the same degree of irradiation will fail to protect. This phenomenon, translated into terms of clinical medicine, signifies that the atrophic or marasmic infant—notably unsusceptible to rickets—has, in relation to this disorder, a far smaller requirement of active light rays than the rapidly growing normal infant. Three-quarters of the infants developing clinical rickets in our institution have been thriving well, whereas only one-quarter developed the disease while making small gains. This is one explanation, as can be shown by animal experiment, of the 'spontaneous cures' which occur in infants during the second year of life when the growth impulse is less intense. A third factor affecting the potency of light is the intensity of pigmentation of the skin. This aspect likewise can be demonstrated by a simple experiment. If two groups of rats (the melanotic form of the Norway rat) are given the minimal protective dose of light, it will be found that although diet and rate of growth have been the same, the black rats will develop rickets, whereas the white rats will show no rachitic lesions. It is manifest that the protective rays were rendered inert by the pigment of the integument and the fur. This experiment has evident applicability to the well-recognized susceptibility of negro infants to rickets, and may be interpreted as indicating that negro infants require a greater degree of the effective light rays than do white infants."

The history of the use of light in the treatment of rickets is discussed more fully by Park.[18]

In 1902 Bernhard, as pointed out by Rollier,[1] obtained good results by exposing affected extremities of patients to sunlight. In 1903 Rollier[1] began his work in the treatment of tuberculosis by the sun's rays. Since that time Rollier and many others have proved conclusively that heliotherapy when combined with dietetic and hygienic regimen produces excellent results in tuberculosis of certain parts of the body other than the lungs. The recent experimental work of Mayer and Dworski[19] led them to the following conclusion: "We believe that our experiments show that the ultra-violet light has definitely influenced the healing of corneal tubercle of rabbits' eyes." Until very recently it was believed that heliotherapy is contraindicated in pulmonary tuberculosis. Here again recent investigations have contributed much to our store of knowledge. LoGrasso and Balderrey[20] found that patients taking heliotherapy show an increase in hemoglobin, a diminution in the leucocytes and a corresponding increase in the lymphocytes. After applying heliotherapy to patients suffering from pulmonary tuberculosis they said: "Heliotherapy is of greatest value in the treatment of pulmonary tuberculosis, one of the most marked benefits noted being the striking improvement in the general physical condition." "It lessens the activity of the pulmonary lesion, as indicated by the subsidence of fever, reduction in pulse rate, decrease in moisture, cessation of night sweats, decrease in amount of sputum and greater ease in expectoration." "According to our experience heliotherapy will not provoke hemoptysis, increase the activity of a lesion, or reactivate it if judiciously employed." "Moderate elevations of temperature, not due to acute complications, do not preclude its use, but we recognize as contraindications tuberculosis in the very active stage, marked toxemia and the acute miliary form of the disease."

The value of heliotherapy in certain diseases cannot be questioned. A great many of the good reports have come from hospitals, so many indeed that there has developed the belief among some physicians that heliotherapy cannot be satisfactorily employed except in institutions. It is true that heliotherapy like other special forms of treatment can be more easily administered in hospitals, but it is sufficiently easily administered in the home to make it available for the great mass of patients who cannot or will not go to hospitals. Moreover, hospital capacity in this country is often so limited that patients are long on the waiting list and must be discharged before their recovery is complete. Such patients should have the benefit of heliotherapy when indicated.

HOW CAN HELIOTHERAPY BE ADMINISTERED TO THE PATIENT OUTSIDE THE HOSPITAL?

In certain sections of the United States the sun's rays may be used the greater part of the year, but in other parts, particularly in the states of the

north, the winter season is too cold and the sunshine too scant to be of much use. During the other seasons of the year it is remarkable how much good may be accomplished by the proper use of sunlight. The sun's rays are just as effective and in some instances more so about a private home than about a hospital. This is especially true when the home is located near the city limits or in the country. A very little trouble on the part of some member of the family will often make it possible for the patient to take heliotherapy although the home is located in a densely populated residence district of a city. For example, one patient gave up sanatorium treatment about the time symptoms suggestive of intestinal tuberculosis were appearing. She had suffered from an extensive pulmonary tuberculosis, but this was largely brought under control by artificial pneumothorax. When she returned to her home she was advised to take sunlight exposures daily. On first thought this seemed to her an impossibility inasmuch as her home was located close to other homes. Her husband, being a carpenter, went to the attic, where he converted a small window into a door on the south side of the house. He then built out from this door a small porch. This was high enough above the surrounding houses so that the patient could lie in the sunshine without being seen by neighbors or people passing on the street. She was kept under medical supervision and although three years have passed and she is still

Figure 1

taking artificial pneumothorax treatment all symptoms referable to tuberculosis in any part of her body have long since disappeared and she has assumed all of her duties in the home.

Figure 1 shows how a husband converted the roof of an old woodshed into a suitable place for his tuberculous wife to take heliotherapy. After being exposed to the sun's rays here through the late spring, summer and early fall months, this patient had a splendid coat of tan and showed much improvement in her general condition.

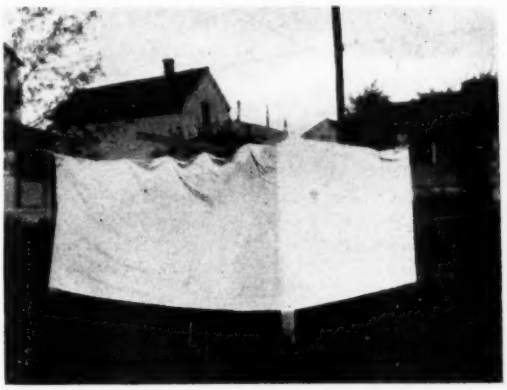

Figure 2A

Figure 2B

In Figure 2-A is shown a frame which a young man made in order that his tuberculous sister might take heliotherapy in their back yard. Their home is located in a rather densely populated part of a city. The canvas stretched about the frame makes it possible for the patient to prepare for the exposure and lie on the cot (B) unseen. The canvas is so placed that one or more sides may be lowered (see Figure 2-B) and yet the patient is kept protected from the view of neighbors.

Many other ingenious devices might be cited but suffice it to say that nearly any one, even though living in a city, who is sufficiently desirous of

taking heliotherapy may do so during certain seasons of the year. I well recall listening to a lecture on heliotherapy less than a decade ago in which the lecturer advocated the building of small glass houses for patients. Evidently he did not know that ordinary window glass filters out most of the rays of therapeutic value. We now know that no glass should be interposed between the source of light and the patient's body.

The technique for administering natural sunlight has been so carefully described recently by Lo-Grasso and Balderrey[20] that I cannot do better than quote them.

"First Day: The patient, reclining on a bed, and with eyes protected from the sun by means of colored glasses or towel and the head by a linen cap or bonnet, was taken to the sunporch. The only clothing worn was trunks. Only the feet were exposed and irradiated on this day. They were insolated for periods of five minutes three times during the day with intervals of about one hour.

"Second Day: Each insolation period of the feet was increased to ten minutes, and more of the body was treated by insolating the lower extremity from the knees to the ankles for five minutes.

"Third Day: The feet were irradiated for fifteen minutes at each period. The time of insolation, from the knees to the ankles, was increased five minutes, and still more of the lower extremity treated to insolation by exposing from the hips to the knees for five minutes.

"Fourth Day: The entire lower extremity was now receiving sunlight in the following doses: hips to knees, 10 minutes; knees to ankles, 15 minutes; and feet 20 minutes. The abdomen was now insolated for five minutes.

"Fifth Day: The insolation periods were now: abdomen, 10 minutes; thighs, 15 minutes; legs, 20 minutes; and feet 25 minutes. The last part of the body to receive its initial insolation, the chest, was now exposed for five minutes.

"The periods of insolation were correspondingly increased 5 minutes each day upon each previous subdivision of the body, until on the 12th day the longest exposed part received a total radiation time of three hours, the exposure periods being: for the feet, 60 minutes; knees to ankles, 55 minutes; thighs, 50 minutes; abdomen, 45 minutes; and chest, 40 minutes. From this day to the 16th the insolation period of the feet remained 60 minutes. The remaining subdivisions were increased by 5 minutes each day until each subdivision received 60 minutes irradiation. On the 17th day the insolations were reduced to one morning and one afternoon period of 90 minutes each. The anterior and posterior surfaces received the same amount of radiation, the total exposure being divided equally between the two surfaces.

"All cases were advised to take an air bath during the regular hours, when the sun's energy was not available for radiation. No more than three hours of sun per day, or one and a half hours for a single exposure, was allowed. This was found to be necessary, as the patients had a tendency to increase the radiation time in the hope that a cure might be more quickly effected.

"The pulse, temperature, respiration and blood pressure were observed before, during and at the end of the radiation periods."

During the winter season in certain parts of the world it is impossible to use the sun's rays therapeutically; therefore, we are fortunate in that we may substitute the rays of the quartz mercury vapor lamp. Some workers believe that the rays from this lamp are less valuable, while others believe that for certain conditions they are more valuable than the sun's rays. One disadvantage of the lamp is that it requires electric current. There are on the other hand definite advantages such as (1) the intensity of the rays, which is always approximately the same; (2) the treatments may be taken at any time during the day or night and at any season of the year. Because of these advantages some patients prefer to use the lamp throughout the year. For a number of years I have used the Alpine lamp. Patients who are physically able, come to the office for their treatments. Most patients require much rest and conservation of energy; therefore, a trip to an office every day or even two or three times per week is definitely contraindicated. In such cases, I have obtained excellent results by possessing a sufficient number of Alpine lamps for use in the homes. A lamp is installed in the home where the patient has its exclusive use. The patient is then kept under careful supervision while heliotherapy is being administered.

At this time I desire to present four cases who have been treated by natural and artificial sunlight.

Case 1. This lady of forty years was first given a diagnosis of tuberculosis in July, 1921. She had an extensive process involving the left lung. Artificial pneumothorax was begun in September, 1921, and she was admitted to the Glen Lake Sanatorium in October, 1921. While there, artificial pneumothorax was continued. After admission to the Sanatorium she developed symptoms somewhat suggestive of tuberculous enteritis. Careful examination there revealed questionable tuberculosis of the cecum. She was discharged from the Sanatorium in May, 1922. Inasmuch as the abdominal symptoms continued long after her return home she was advised to take heliotherapy. Alpine lamp treatments were begun in February, 1923, and continued until late spring, when natural sunlight was employed until fall. In the late fall an Alpine lamp was installed in her home where she took heliotherapy all winter. In the spring she again resorted to natural sunlight. During all of this time her tuberculous lung has been kept

collapsed artificially. She has gained in weight from 136 pounds upon discharge from the sanatorium to 158 pounds at present. All symptoms of tuberculous enteritis have disappeared and she is now doing her own house work.

Case 2. This man of forty-three years developed a tuberculous epididymitis and was treated surgically in the spring of 1920. He was found to have bilateral apical pulmonary tuberculosis in March, 1921. He was admitted to the Glen Lake Sanatorium in March, 1921, where heliotherapy was carefully administered. After discharge from the sanatorium in October, 1922, he developed a business enterprise which makes it possible for him to direct his own physical activities. He is so firmly convinced that heliotherapy did him great good that ever since his discharge from the sanatorium he has come to the office regularly for sunlight treatments. His working capacity is excellent.

Case 3. This lady of thirty-five years was first told that she had tuberculosis four and one-half years ago. She was placed on home treatment but in September, 1922, had a relapse. Examination in November, 1922, revealed extensive tuberculosis of the right upper lobe with cavity formation. The left upper lobe was slightly involved. She complained of malaise, loss of strength and loss of weight. She was made a bed patient on November 11, 1922, and an Alpine lamp was installed in her home on December 1, 1922. She improved so as to be able to sit up for one meal Dec. 25, 1922. She was given five minutes exercise per day March 1, 1923. Then her exercise was gradually increased until May 5, 1923, when she developed a severe acute respiratory infection with high temperature. This resulted in a spreading of the tuberculous lesion. She was then made a bed patient until Sept. 1, 1923. Since September, 1923, she has been on graduated exercise and at present her weight is 120 pounds. She is now walking one and one-half hours per day in addition to performing the usual duties about her home.

Case 4. This man of thirty-five years was informed that he was suffering from pulmonary tuberculosis in the summer of 1919. In November, 1919, he entered a sanatorium from which he was discharged in February, 1920. In the spring of 1920 he had a severe hemorrhage, after which he was placed on absolute bed treatment until February, 1921. He states that from this time until February, 1922, he spent considerable time resting in bed but also took some physical exercise. In February, 1922, he went to work, but in the late summer some of his old symptoms recurred. At the same time he was told that a myocarditis had developed. He then became a bed patient again until November, 1922, when his tonsils were removed because it was thought that they were definitely infected. He then continued home treatment until April, 1923, when his appendix was removed because of abdominal symptoms and signs suggestive of appendicitis and tuberculous enteritis. After removal from the hospital to his home he was told that he was suffering from tuberculosis of the intestine and that further treatment would be of no avail. At this time the wound following laparotomy was discharging considerable pus, he had a marked tuberculous cervical adenitis on the right side. There was definite evidence of an extensive tuberculous process involving the upper lobe of the right lung and a less extensive process in the upper lobe of the left lung. His temperature was ranging from 100 to 104 degrees daily. He complained of distressing pain over the abdomen, nausea and vomiting, four to five bowel movements per day, loss of appetite and loss of weight to 94 pounds. In July, 1923, an Alpine lamp was installed in his home. In just a few days his skin began to show evidence of tanning and within a week his appetite began to reappear. As the tanning progressed the vomiting stopped, the abdominal pain disappeared, the abdominal wound healed, the temperature became normal and the body weight began to increase. In due time he was placed on graduated exercise and in February, 1924, he returned to work. He has now worked slightly longer than one year and has gained from 94 to 170 pounds. Although he now has an excellent working capacity, he keeps under close medical supervision and is very cooperative.

I desire to make it clear that I do not believe heliotherapy is in itself sufficient in the treatment of any case of tuberculosis. However, when carefully administered with the other therapeutic procedures indicated in each individual case I have found it of tremendous value. I have become thoroughly convinced that heliotherapy has a four-fold value. First, it acts as a tonic. It has been shown to change the blood picture and probably the blood chemistry in a manner favorable to the patient. Second, it induces the patient to rest quietly while the exposure is being made. When the periods of exposure are long this period of rest becomes an important factor in the treatment of the patient. Third, in addition to the sun bath the patient gets an air bath which is of unquestionable value. Fourth, it is a tangible form of treatment—the patient sees the skin becoming pigmented and feels definitely improved from time to time. Not infrequently by the administration of heliotherapy it is possible to keep a tuberculous patient on the dietetic and hygienic treatment for months after all treatment would otherwise be abandoned. Therefore, the physician who employs heliotherapy will be able many times to secure an arrest of the tuberculous process and a restoration of the working capacity, whereas without heliotherapy no better than a condition of quiescence could be secured.

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ADVANTAGES OF DIRECT CYSTOSCOPY*

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There are numerous adherents both of direct and and indirect cystoscopy. However, it should be recognized that each method possesses advantages which are lacking in the other and the urologist should be adept in the use of both. The direct cystoscope of Braasch, which is a modification of the Elsner and Koch cystoscopes, is the commonest type in use (Figs. 1 and 2). The principle of using a water medium with direct cystoscopy was

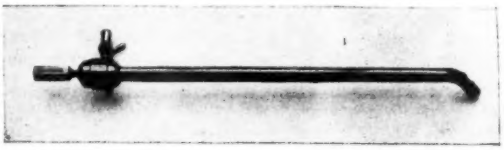

Fig. 1. The Braasch direct cystoscope showing the obturator in place.

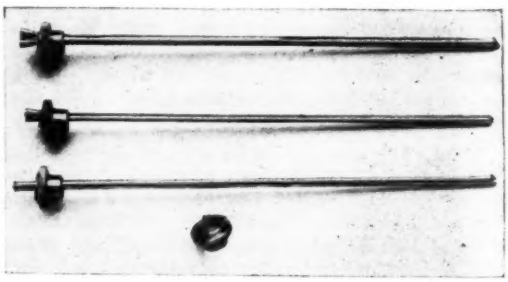

Fig. 2. The single, caliber No. 9, the double and the triple catheterizing guides of the Braasch cystoscope. The ocular window is for purposes of observation.

suggested by Millet in 1904. Of the many indirect types, the Brown-Buerger cystoscope is probably the most widely used. Among others may be mentioned the Bransford Lewis Universal cystoscope, the George Wolf cystoscope and the McCarthy cysto-urethroscope. There have been various modifications of the indirect type for special work, such as rongeurs, specimen-takers, and lithotrites. The new McCarthy cysto-urethroscope has included some of the principles of both the direct and the indirect cystoscopes.

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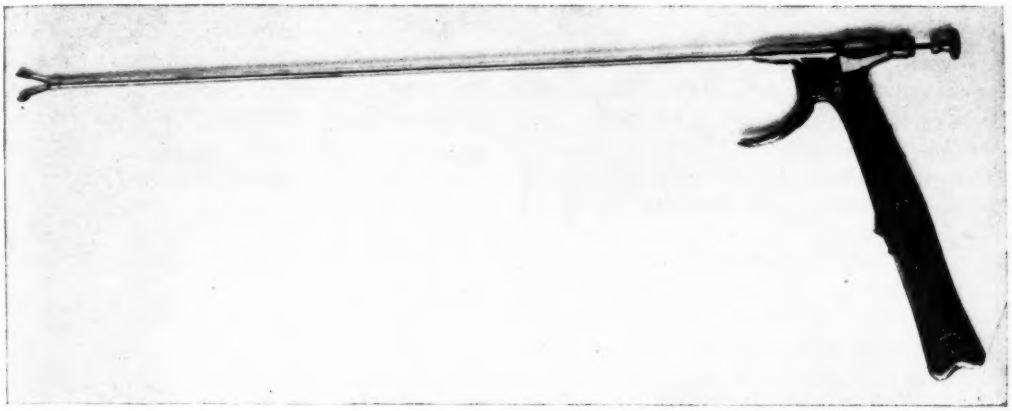

Fig. 3. Rigid specimen-taker.

Fig. 4. Rigid specimen-taker.

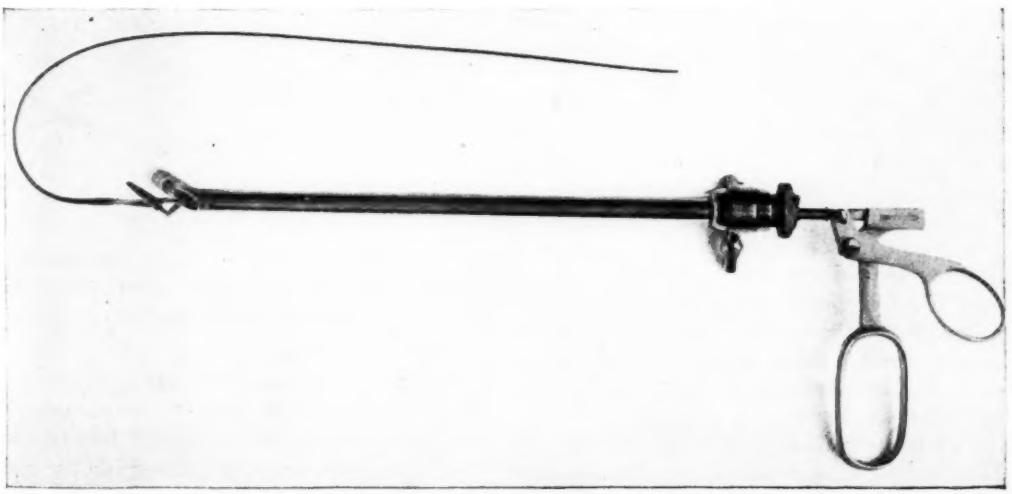

Fig. 5. The Bumpus ureteral meatotomy scissors with a filiform mounted on one blade.

The main difference between the direct and the indirect-vision cystoscopes is that the former consists merely of a hollow tube with a window at one end through which the bladder is viewed, while the latter is made with a lens which gives a "periscope" view of the bladder. This fundamental difference in the two types naturally gives rise to various advantages and disadvantages peculiar to each.

ADVANTAGES OF THE DIRECT CYSTOSCOPE

1. With the direct cystoscope the bladder itself is viewed, whereas with the indirect cystoscope only a reflected, and somewhat distorted, image is seen.

2. The direct type is particularly useful in facilitating the removal of specimens from tumors of the bladder for diagnosis. A rigid specimen-taker is infinitely superior to a flexible one, which must necessarily be used with an indirect cystoscope (Figs. 3 and 4). In obtaining a specimen the barrel of the cystoscope is pressed against the tumor in such a manner as to fix it. The window of the cystoscope is then removed and the specimen-taker inserted. The microscopic examination of the tumor not only establishes whether it is malignant, but how malignant it is, and so determines the method of treatment.

3. The direct cystoscope is very useful in removing foreign bodies from the bladder. Catheter heads, pieces of rubber tissue, hairpins, and LaForte filiforms, and so forth, occasionally found in bladders, can usually be removed easily in the same manner as specimens. A string loop threaded through the eyes of a ureteral catheter is often used for the removal of sharp objects, such as hairpins.

4. Stone in the bladder, after it has been crushed by a lithotrite, can be removed by the aid of the direct cystoscope. The instrument is manipulated until its beak is adjacent to a collection of the fragments, the window is then removed and the particles are forced out with cystoscopic fluid by the expulsive power of the bladder.

5. The operation of ureteral meatotomy can be accomplished successfully through the direct cystoscope. Flexible meatus scissors do not have sufficient rigidity to permit successful cutting. Recently Bumpus has devised rigid meatus scissors with a LaForte filiform mounted on the end of one blade. These scissors can only be used through a direct cystoscope (Fig. 5).

6. The direct cystoscope permits the insertion of three, and sometimes four, No. 6 ureteral catheters into one ureter for the purpose of manipulating stone in the ureter. A three-way catheterizing guide invented by Braasch permits the simultaneous introduction of three No. 6 ureteral catheters into one ureter (Figs. 6, 7 and 8). The cystoscope is withdrawn, and a small, single catheterizing guide cystoscope re-inserted alongside the three ureteral catheters, and a fourth catheter placed in the ureter. Forty-eight hours later, after the injection of a lubricant, all four catheters are removed by a twisting motion, which will frequently bring the stone. If the stone is not delivered immediately, the dilatation is sufficient for it to pass, in 70 per cent of the cases, within the next forty-eight hours.

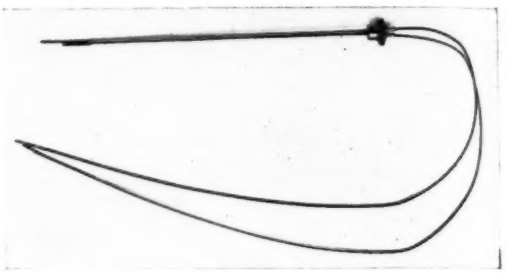

Fig. 6. The double catheterizing guide, with catheters in position.

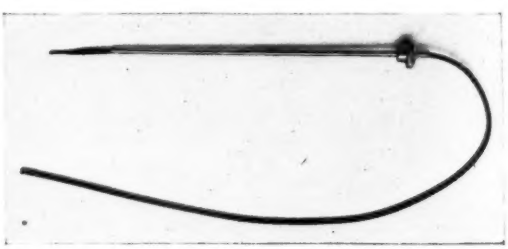

Fig. 7. The triple catheterizing guide, with catheters in position.

7. Various medications may be applied to the bladder through the direct cystoscope. Other methods of treatment, such as curettage, are also possible.

8. The direct cystoscope combines cystoscope with urethroscope. In every cystoscopic examination, the posterior urethra should be examined. The indirect cystoscope is not suitable for endoscopic work because the magnification distorts the

field and makes interpretation exceedingly difficult. With the Braasch cystoscope a complete examination of both bladder and urethra can be made.

9. The direct cystoscope is ideal for examining hemorrhagic fields. With the indirect cystoscope, the field of vision is blurred as soon as the medium becomes bloody, because the field of vision cannot be washed by the cystoscopic fluid. With the direct instrument the field of vision and the field that the fluid enters are the same. The fluid continually washes away the blood and permits visualization of the bleeding point.

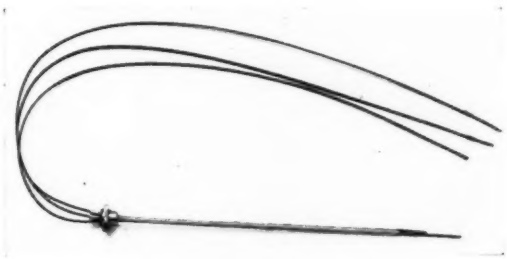

Fig. 8. The large single catheterizing guide carrying a No. 9 Garceau catheter.

10. The direct cystoscope is a simple instrument, and does not require all the accessories necessary to the indirect cystoscope. It does not contain lenses or get out of order readily. It does not have to be handled with exceeding care, and can be sterilized easily.

THE DISADVANTAGES OF THE DIRECT CYSTOSCOPE

1. The direct cystoscope may, in some cases, cause slight pain when the ureters are catheterized. There is, however, but little difference in the severity of postcystoscopic reactions.

2. The direct cystoscope is not as satisfactory as the indirect for examining and treating lesions located in the dome and the anterior wall of the bladder. In a few cases the angle of the posterior urethra with the bladder may not permit a complete view of these parts. For this reason if the dome and the anterior wall of the bladder are to be examined for tumor or for pan-mural ulcer, it may be advisable to use an indirect cystoscope.

3. The direct cystoscope shows a smaller field than the indirect, but this is of very little practical consequence.

4. The direct cystoscope does not give a magnified view of the bladder and the details of the mucosa cannot be so clearly visualized.

COMMENT

It is readily seen that the main objection to the direct cystoscope is that it cannot be used in the treatment of the dome and anterior wall of the bladder. Aside from this it can be used just as readily for all types of cases as the indirect cystoscope, besides possessing many distinct advantages over the latter. It is used in approximately 95 per cent of all cystoscopic examinations at the Mayo Clinic. However, in order to render adequate cystoscopic service, one should be entirely familiar with both direct and indirect cystoscopy, and the type of instrument used should be that which is best suited to the peculiarities of the individual case.

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IRON CITRATE GREEN-P. D. & CO. ACCEPTED FOR N. N. R.

The Council on Pharmacy and Chemistry explains that iron citrate green-P. D. and Co. has been accepted for New and Non-official Remedies. In the past, the Council has reported that the so-called iron citrate green and solutions of it intended for subcutaneous or intramuscular administration had been found inadmissible to New and Non-official Remedies because no evidence had been presented to show that the green iron citrate had any advantages over the pharmacopeial iron and ammonium citrate, and because there was no evidence to show that the subcutaneous or intramuscular administration of iron preparations was rational. Parke, Davis & Co. has submitted evidence to show that the injection of solutions of the official iron and ammonium citrate and of certain brands of green iron citrate produce pain. The firm adopted the use of a green iron and ammonium citrate containing the equivalent of 8.1 per cent of amomnia. The Council is not convinced that the hypodermic or intramuscular administration of iron yields effects which differ from those obtained by the oral administration. However, the uncertain state of iron therapy and the rather large clinical use of iron by subcutaneous or intramuscular injection, combined with the lack of danger from this method of use, appear sufficient to warrant the provisional acceptance for New and Non-official Remedies of iron preparations intended for subcutaneous or intramuscular use. *(Jour. A. M. A., Apr. 4, 1925, p. 1045.)*

ACUTE PANCREATITIS*
Discussion of Seven Cases

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Acute pancreatitis, or acute pancreatic necrosis, as it may more appropriately be named, should be a subject of interest to nearly all of us. It is liable to enter prominently, suddenly, and dramatically into our experience at any time. If we are not watchful, the curtain may go down on the last act before we are well awake to our cue for the first act.

Symmers[1] of Dublin in 1917 reported a series of cases in which death was so sudden and so absolutely unexplained that a coroner's inquest was necessary in each case to determine the cause of death. Other authors have also reported cases ending in death within a very few hours.

Case 1: In the first case of this series, death occurred within 48 hours. A young healthy nurse was seized at 4 A. M. with vomiting, air hunger, and agonizing pain in the epigastrium. Sir Berkeley Moynihan[2] says: "The first and chiefest symptom is pain; and of all the pains that the human body can suffer, this is the worst." When this woman was seen by a surgeon later in the day, his examination revealed a rigid upper abdomen, a very rapid pulse (144), and only slight fever (99.5). The urine showed much albumen, casts, acetone and diacetic acid, and a marked glycosuria. Operation was performed at once, twelve hours after the onset of pain, under the diagnosis of perforated duodenal ulcer. The stomach, duodenum, gallbladder, and kidneys were normal, and there was neither peritoneal inflammation nor fat necrosis. Death occurred, in coma, within 48 hours after onset of the pain. Autopsy showed no pathology excepting acute necrosis of the head of the pancreas. The head of the pancreas was hard and red, but there was no free fluid in the peritoneal cavity, and no areas of fat necrosis were found.

Death, in such cases suffering profound shock and very early death, is generally ascribed to the absorption of split protein products from the digested pancreatic tissue. According to Archibald[3], with whom most authorities agree in this respect, "the fundamental lesion is a necrosis of the parenchyma, a necrosis apparently caused by the action of a powerful chemical irritant rather than by bacterial inflammation." The powerful chemical irritant is generally agreed to be trypsin —in other words, the harmless trypsinogen of the pancreatic juice has been activated within the gland itself by the action of some extraneous substance. The activation, according to some authors, is due to infection carreid from the gallbladder or other nearby organ to the regional lymph nodes, and then by retrograde extension through the lymphatics into the pancreas. According to other authorities, the activating agent is some extraneous substance, such as bile or duodenal contents, carried up into the pancreas through the duct of Wirsung or the duct of Santorini. The problem has been widely studied, and is still under discussion.

Fig. 1. Plate reproduced from Archibald (3), showing the relation of the pancreas to the greater and lesser peritoneal cavities, and to the stomach, colon, duodenum, and the retroperitoneal space. (Modified from Piersol.)

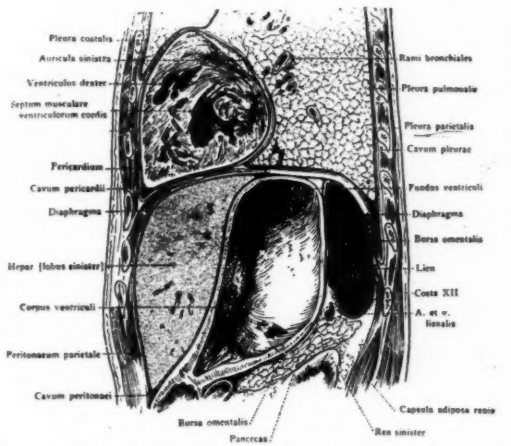
Some maintain that the disturbing factor enters always by way of the lymphatics; some that it enters always through the pancreatic ducts; and some that there are two types of pancreatitis, an acute pancreatic necrosis due to a disturbing element entering through the ducts, and a chronic inflammatory lesion due to infection entering through the lymphatics or the blood stream. In the first case of my series it would seem that the ducts must have carried the activating substance.

In this same case it is remarkable that no scattered areas of fat necrosis were found. Some authors describe fat necrosis as a condition always found. However, cases without fat necrosis have been reported, usually when the disease was so severe as to cause very early death. Prat[4] of Montevideo, Uruguay, has recently reported two cases without fat necrosis. One robust young man died less than eight hours after the sudden onset of continuous agonizing pain with rapid filiform

*Presented before the Hennepin County Medical Society, March 11, 1925.

pulse; there were no other appreciable symptoms. In his second case, that of a man twenty-eight years old, operation in the sixteenth hour showed an enlarged hard pancreas but no fat necrosis. Recovery followed drainage of the gall-bladder.

And now before leaving our first and most tragic case we must consider one other feature—the observation of glycosuria and coma. The patient was seen in March, 1917, before the days of insulin; perhaps she would have had a better chance today. In January, 1924, Rodriguez[5] of Fort Wayne reported a case of acute pancreatitis complicated by diabetic coma in which insulin in large amounts reduced the blood sugar content from over 600 mgm. per 100 c.c. to less than 100 mgm.



Lateral, sagittal section through the left thorax and upper portion of abdomen, viewed from the left. The plane of the section lies 4 cm. to the left of the median plane.

Fig. 2. Plate reproduced from Manual of Surgical Anatomy, U. S. Army Medical Department, 1918, p. 151, showing the relation of the pancreas to the left lumbar region. Lateral sagittal section 4 cm. to the left of the median plane.

However, the patient, after improvement for some days, died rather suddenly in coma with a blood sugar of 360 mgm., a victim, it was thought, of total pancreatic insufficiency. So, perhaps, insulin would have altered the outcome in our nurse who suffered from necrosis of only the head of the pancreas.

Case 2: Acute pancreatitis is not usually quite so fulminating. A man fifty-eight years old had an attack of gallstone colic with jaundice twenty-eight years ago, and several short attacks during the last year. On July 30, 1920, in the afternoon, he was seized with a sudden very severe pain in the epigastrium. By the time he reached home he was in such profound stock that he could not be carried to his apartment on the second floor. There was no vomiting. Temperature and pulse were normal. Tenderness was present in the left hypochondrium. On the third day the temperature continued normal and the pulse was only 90. There were pain and tenderness in the left hypochondrium and through to the left lumbar region, but there was no tenderness over the gallbladder. There was dullness in the flanks and a bluish discoloration of the skin there, this latter being a very significant sign.[2] There was slight tympanites. A diagnosis of probable acute pancreatitis was made. On the next day, August 2, he was more restless. The temperature was normal, but the leucocyte count was 18,000 and the urine contained albumen and many granular and hyaline casts. On August 4, after a night of restlessness and delirium not controlled by morphin, the patient was admitted to the hospital. The pulse rate exceeded 100, but the temperature was still normal. The urine was scanty and contained more albumen and casts; the leucocyte count was 17,000. There was more resistance in the left abdomen and more dullness in the flanks. The condition of the patient did not warrant operation. His delirium continued, his pulse became more rapid, and he died that same evening, five days after onset of the illness.

Autopsy showed free bloody fluid in the peritoneal cavity, extensive scattered extraperitoneal and perirenal fat necrosis. There were many small calculi in the gallbladder and common bile duct, but none at the ampulla of Vater. The pancreas demonstrated the typical acute pancreatic necrosis of severe grade. The pancreas was fully four times its normal size, dark red to black in color, and hard. The scattered small areas of chalky grey fat necrosis in the peripancreatic fat were prominently visible.

The question of the relation of this man's gallstones to his acute pancreatitis is of special interest. One of two things may have happened. First,

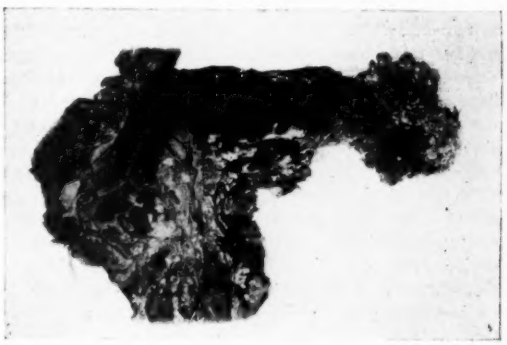


Fig. 3. Cut section of pancreas from Case 2 showing the necrosis of the gland and the dull white areas of fat necrosis.

one of the small stones may have lodged at the outlet of the ampulla, blocking it and converting the common bile duct and pancreatic duct into one continuous passage. Some of the obviously diseased and chemically altered bile would then have

entered the pancreas and activated the pancreatic secretion within the gland itself. Such a stone might have receded up the common duct or have been passed into the duodenum before the time of the autopsy. Second, a temporary paralysis of the sphincter of Oddi by passage of a small calculus may have allowed duodenal contents to pass up the pancreatic duct. That also would have activated the pancreatic fluid within the gland. In either case the complete blockage of the exit must have been of short duration, as the patient was at no time jaundiced.

This patient was observed by me only on the last day of his life and at autopsy. After his admission to the hospital he was in no condition for operation; as to the operability on August 1st, when the diagnosis was first suggested, I do not know. At the time that the patient was under observation many authorities were advocating delay in operation until recovery from the initial shock. More recently most surgeons have come to agree that operation as soon as possible gives the best prognosis in these cases. The prognosis is, of course, extremely grave under any management.

CASE 3: This next case illustrates a somewhat less rapid course of the disease. The patient was operated within a few days after the onset of his illness and lived about three weeks. For years before his final illness he had had attacks of pain in the lower abdomen. Four, and again two months ago, there had been attacks of acute pain in the upper abdomen, which had been diagnosed as gallstone colic. Six days before entering the hospital he began to have severe upper abdominal pain unrelated to meals; during the last two days the pain had been very severe and continuous. Temperature and pulse were normal. He had been given morphin by his physician before being sent to the hospital, but nevertheless one and one-half grains were required in the twelve hours between his admission and the operation. Examination on admission showed slight distention of the abdomen, marked rigidity and muscle spasm of the upper abdomen more especially to the right, and marked tenderness in the epigastrium extending from the right over to the left hypochondrium. The extension of the tenderness to the left upper quadrant is recognized as an important sign in the differential diagnosis of acute pancreatitis.[2,3] The same sign has been noted in the second case of this series.

Operation showed the gallbladder and bile ducts to be normal and free from stones. There was a quantity of bloody serum free in the peritoneal cavity. There were areas of fat necrosis in the omentum and in the fat at the root of the transverse mesocolon. The pancreas was red, swollen, and hard throughout. Drains were inserted and the abdomen closed.

The patient's general condition gradually improved, but there was digestion of the edges of the wound so that the upper part gave way four days later, and a second operation became necessary. When the lesser peritoneal cavity was opened, the pancreas was found to be smaller and less red, but it contained several abscesses, the largest about the size of a hazel nut. Staphylococcus aureus was grown in a culture from one of the abscesses. Five or six longitudinal slits were made into the pancreas, and drains placed down to the pancreas. The patient improved temporarily a little, but the temperature soon again rose, with rapid pulse and respiration, and leucocytosis. The wound edges again were digested and gaped. The patient gradually grew weaker and died twelve days after the second operation, and twenty-three days after the onset of his final illness.

Autopsy showed extensive fat necrosis. The pancreas was necrotic—partly hard and dark red, partly soft and disintegrated; the head of the organ was the only part approaching normal. The common bile duct was somewhat dilated, especially near the ampulla, but no stones were found. The liver and gallbladder were normal. There

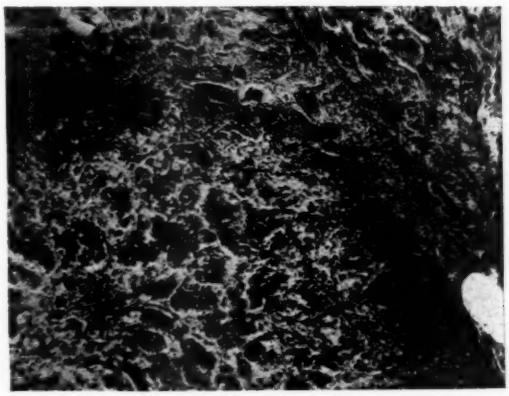


Fig. 4. Photomicrograph from Case 2 showing the margin of a necrotic area. Note the leucocytic infiltration and small hemorrhages in the neighboring tissue.

was a fairly large ulcer in the lesser curvature of the stomach, surrounded by only a moderate degree of inflammatory reaction.

In reviewing this case, we must assume that the previous recurrent attacks of abdominal pain, in the absence of gallbladder disease, were due to earlier attacks of pancreatitis. Although the attacks could not be traced directly to the gastric ulcer, still the ulcer may well have played a part in the causation of the pancreatitis. The association of the two lesions has been noted a number of times, and various explanations have been suggested.

To summarize our third case, we had a patient who had probably suffered a number of attacks of mild acute pancreatitis with spontaneous recov-

ery. At last he suffered a severe and extensive involvement of the gland, was operated, and drained with resultant improvement. Then the wound opened through digestion of its edges by the pancreatic juice, and we saw the sequel in the gland—localized areas of softening with secondary infection. Drainage of the abscesses helped for a time, but he died finally from sepsis and pancreatic insufficiency.

CASE 4: The fourth patient, a man of 53 years, it was my privilege to watch through the last two months of his life; he lived for four months after the onset of his final illness. He was perfectly well until January 11, 1921, when he was suddenly seized, while shaving, by a severe colicky pain in the lower abdomen with vomiting. He was taken to a North Dakota hospital, where he remained for three weeks. His bowels did not move, nor did he expel flatus for nine days. Obstipation is an early and often a very confusing symptom of acute pancreatic necrosis. Pain subsided only slightly after the bowel movement. The bowels moved daily thereafter with cascara. After three weeks he was moved to another hospital and late in February to one of the larger Minnesota hospitals. There an operation was intended for probable carcinoma of the colon, but he went into collapse in the operating room before anything was done or any anesthetic given. The operation was cancelled and he was sent home as being too poor an operative risk.

He was admitted to St. Mary's Hospital of Minneapolis on March 7, 1921, two months after onset of the illness. His weight had decreased from 220 to 175 pounds. A heavy burning feeling in the lower abdomen had persisted, and he was still constipated and distended. The abdomen contained a large firm rounded mass which filled the entire upper abdomen and much of the right lower quadrant; it was situated deeply, moving only slightly during respiration. The feces were normal; the Wassermann test was negative; urine was practically normal; leucocytes numbered 7,600 and erythrocytes 3,900,000; the hemoglobin was 65 per cent. Roentgenographic examination with the aid of a barium meal showed the left diaphragm higher than the right; the stomach high to the left; and the barium going from the stomach high up and far to the right, and thence down to the lower abdomen into the small intestine; the transverse colon was apparently in normal position. A large empty area, surrounded by an apparent capsule, occupied most of the abdominal cavity in a central position. Barium enema showed partial obstruction of the transverse colon near the hepatic flexure; the flow of barium stopped at that point, but later a little leaked beyond and into the cecum.

Operation was performed on March 17. Masses of fat necrosis in the omentum drew immediate attention to the pancreas. A large deep abdominal mass was exposed through the gastro-colic omentum; it was a very large retroperitoneal pseudo-cyst presenting directly behind the transverse colon and occupying by far the greatest part of the abdomen. Its surface was irregularly studded with patches of fat necrosis. It contained a very cloudy but thin gray-green fluid; a very large amount (perhaps two gallons) was removed, containing no bacteria and no demonstrable pancreatic ferment. The cyst was drained.

The patient improved markedly for about a week, after which he developed an afternoon fever. About twelve days after operation skin digestion began to be evident at the drainage site. On April 11, there was a hemorrhage of 150-175 c.c. from the wound. The hemoglobin had been steadily dropping since his entrance into the hospital, and this hemorrhage did not help matters. By April 22, the hemoglobin had dropped to 38 per cent. The tube was often plugged by necrotic debris so that it had to be repeatedly washed and reinserted. An earlier unsuccessful attempt had been made to dispense with the drainage tube. On April 23, counter-drainage was established in the left flank just in front of the kidney. At that time the cyst had contracted to a diameter of about 4 or 5 inches and was filled with cheesy material. On April 27 the patient received a blood transfusion. On May 1 he lost about 150 c.c. of blood through the drainage tube. His appetite had gradually failed, and he had started to vomit more and more, so that he was finally unable to retain anything. He died on May 10, 1921, from exhaustion, with subnormal temperature.

Autopsy revealed no trace of living pancreatic tissue, but only some necrotic debris at the site of the pancreas. The posterior part of the cyst wall was still present, but microscopic section (Fig. 5) shows no real cyst lining. The necrosis had extended downward retroperitoneally far beyond the pancreatic area. There was no gross evidence of infection.

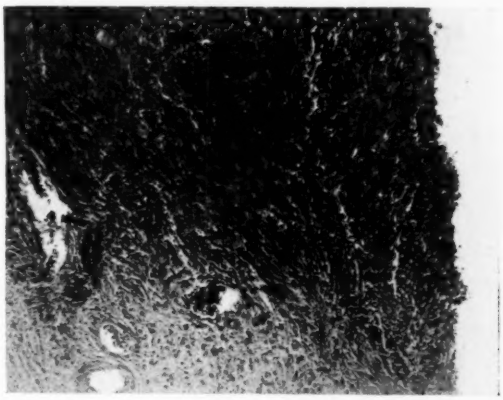


Fig. 5. Photomicrograph from Case 4 to show the wall of the pseudocyst. Note the absence of lining membrane and the marked leucocytic and fibrous tissue reaction.

Here, then, was a patient who suffered an attack of acute pancreatitis, and spontaneously overcame the immediate danger. He then lived for four months with steady loss of weight and strength. The process was only fairly well walled off with formation of a pseudo-cyst, but with gradual extension of the necrosis. The spread of the necrosis went on in spite of good drainage. The

patient finally died of total pancreatic insufficiency. The factor of secondary infection did not apparently have a part in the progress of this case. Delbet[6] cited a case in 1924 in which formation of a pseudo-cyst occurred after an attack of acute pancreatic necrosis. In that case also the content of the cyst was sterile.

Although the two hemorrhages were not predominant factors in causing the death of our patient, they call attention to one of the complications most to be feared. Deaver[7] particularly has emphasized the danger of large post-operative hemorrhages. Of course hemorrhages are not limited to the post-operative period. Moench[8] of New York in 1921 reported the case of a woman who died unoperated within eight hours after the onset of her illness, the abdomen, at autopsy, being found to contain quarts of fluid blood. The evident source of the hemorrhage was a necrosis of the splenic artery where it lay in contact with a necrotic bile-stained area of the pancreas one-fourth inch in diameter and one inch long.

CASE 5: Now, for a change, let us consider a patient who is alive and quite well today. This stout woman, sixty-two years old, suffered an attack of upper abdominal pain with jaundice three years ago, since which time she complained persistently of "stomach trouble." On November 24, 1924, she began to have abdominal pain; on November 25 it became severe and she vomited. During the night of November 26 the pain was so severe that it was not controlled by over 3 grains of morphin in one-half to one grain doses. The pain was felt principally in the upper abdomen. She vomited continuously, although she took no food. She was admitted to St. Mary's Hospital on the morning of November 27. Temperature, pulse, and respiration were practically normal. There was definite tenderness over the gallbladder and in the right loin, but the really extreme tenderness was found in the epigastrium and extending to the left of the mid-line, a sign strongly suggesting pancreatitis. There were no palpable masses, and there was no rigidity. The leucocyte count was 19,000; the urine showed much bile and very many granular casts; the blood contained greatly increased amounts of creatinine and urea nitrogen. It was felt that the patient would not stand operation. By December 8 the casts had disappeared from the urine, the leucocyte count was 8,000, and the blood chemistry was normal.

Operation on December 11 (17 days after onset of the illness) disclosed some scattered areas of fat necrosis, but not a very marked enlargement or hardness of the pancreas. The gallbladder was distended, red, and thickened; it contained many stones and thick dark brown fluid; there were stones in the cystic duct; one stone was found outside the gallbladder enclosed in adhesions. The gallbladder was removed and drains placed to the stump of the cystic duct and to the fossa behind the portal vessels.

Convalescence was stormy for a time with the temperature reaching 101 for a few days, and with some drainage of bile. However, recovery was good. The patient went home on January 11 feeling quite well.

This was a very serious case of cholecystitis and cholelithiasis, associated with an acute pancreatitis, which latter was subsiding at the time of operation. That brings us to another problem—the prevention of future attacks of pancreatitis. Our patient was recovering from the pancreatitis spontaneously. But all the factors were at hand for the development of another and possibly fatal attack in the future. Drainage of the pancreatic capsule would do no good in this case. Certainly cholecystostomy would not fill the requirement for a gallbladder already perforated. Cholecystectomy seemed indicated and was carried out, with a good result thus far. In cases operated at the height of a severe acute pancreatitis one would usually be limited to drainage of the pancreatic capsule, with, at most, a cholecystostomy or drainage of the common bile duct. Cholecystectomy, and perhaps even cholecystostomy would have to be left to a later operation. [2, 9]

And now finally we will consider the occurrence of rather mild acute pancreatitis, as it is found in elderly people of low vitality, carrying them off rather through their lack of resistance than through the severity of the lesion.

CASE 6: A woman sixty-three years old gave a history of recurrent attacks of slight pain low in the left side of her abdomen every three or four months during the last thirteen years. Two months before death she had a sudden attack of weakness with loss of appetite but no marked pain. She vomited bile and mucus at times and lost weight. She ate very little and became progressively weaker, having spent the last three weeks in bed. Examination showed a marked cardiac arrhythmia. There was a palpable, rather tender mass in the epigastrium, extending to the left and pulsating; the pulsation was not expansile and the aorta was palpable to the right of the mass. The clinical diagnosis was a malignant tumor of undetermined nature.

Autopsy disclosed, in the pancreas, near its tail, an area of softening surrounded by necrotic tissue and small patches of fat necrosis. Areas of fat necrosis were found around the pancreas and in the omentum. On section of the gland, several small calcareous masses were found in, and in the region of, the ducts, but there was no evidence of carcinoma.

CASE 7: By way of comparison, let me mention the case of an elderly man who died in 1912.* For five weeks he had suffered from extreme gastric irritability. At various times there had been transitory spots of tenderness all over the abdomen. There were felt at different times, indefinable masses, the most constant being in the median line

*History and specimen from the Department of Pathology, University of Minnesota.

midway between the navel and the zyphoid. Autopsy revealed pus pockets and infiltration in the tail of the pancreas, along its midportion, and around the head of the gland. There were scattered particles of fat necrosis.

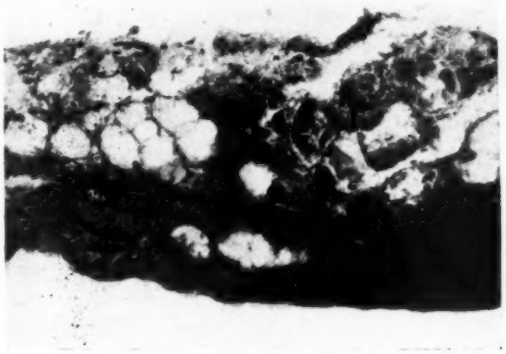


Fig. 6. Photomicrograph from Case 6 showing the contrast between the appearance of the normal fat and that which had undergone fat necrosis.

Pathologically these two cases displayed simply milder degrees of the same disease found in the first cases reported. But how different is the clinical picture! In the last two cases we saw a wasting away without much pain, while in the first we saw what Sir Berkeley Moynihan[2] calls "the most terrible of all the calamities that occur in connection with the abdominal viscera."

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THE CLINICAL INTERPRETATION OF GLYCOSURIA*

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The great majority of individuals with persistent glycosuria are diabetics. A transient glycosuria, however, is frequently encountered and as a rule is not associated with a diabetes mellitus. The correct evaluation of such a finding is therefore most important. A mistaken diagnosis may lead to unnecessary restriction of diet or an unjust refusal of life insurance. On the other hand to overlook an early diabetes is an even more serious mistake. A necessarily partial review of the voluminous literature on the subject has been undertaken and an attempt at a summing up of the subject is here presented.

NORMAL CARBOHYDRATE METABOLISM

Comparatively little of the whole story of carbohydrate metabolism in the human body is known. The first step in the utilization of carbohydrate food is its digestion. Starches are converted in the intestines largely to glucose which is absorbed through the portal circulation and in part polymerized to glycogen in the liver and also in the muscles. Fructose and galactose are similarly absorbed in small amounts. Ingested glucose requires no digestion and its absorption is therefore more rapid than that of starch. According to Shaffer, preliminary conversion of glucose to glycogen before its utilization is not necessary and the utilization of glucose given intravenously is proof that alteration in the digestive tract is not essential. After starvation for two days the liver glycogen has been largely consumed. It has been well established that glucose is derived from protein: possibly glucose may be obtained in small measure from fat.

The fate of the glucose molecule in the tissues is more or less a mystery. According to Shaffer there is evidence that lactic acid is produced from glucose in the blood, liver and kidneys and probably wherever glucose is metabolized, although the succession of steps in the breaking down of the glucose molecule is not proven. Shaffer states there is no evidence to disprove that the main intermediaries between glucose and lactic acid are

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glyceric aldehyde, dihydroxyacetone and methylglyoxal. According to Lusk this conversion of glucose to lactic acid is not an oxidative process. It is commonly believed, however, that oxidation of the lactic acid molecule removes it with the production of heat.

The normal blood sugar in a fasting individual is about .1 per cent. After carbohydrate meals a physiological hyperglycemia is demonstrable which, according to Joslin, may rise as high as .17 per cent. The more rapid the absorption of glucose the higher this hyperglycemia, and, depending on the kidney threshold for sugar, which varies in different individuals, sugar may or may not be demonstrable in the urine by means of the usual qualitative tests. Glycosuria *e saccharo* or *ex amylo* is simply a matter of degree. Jacobson showed that glycosuria *ex amylo* existed in five of twenty-four normal individuals tested. This same investigator found that the blood sugar concentration above which sugar was demonstrable in the urine by the usual qualitative tests lay between .16 and .17 per cent.

Recently it has been established that the urine normally contains a reducing substance to the amount of about 1 gram in twenty-four hours. Such small amounts are not detected by the usual qualitative tests in clinical use. It has not as yet been firmly established just how much of this reducing substance is glucose. Benedict and Osterberg found about .07 per cent sugar in the urine normally, about half of which was fermentable.

The recent experiments of Bailey indicate that the blood and urinary sugar concentrations normally correspond closely up to about .16 to .17 per cent, above which figures sugar is actively excreted by the kidneys. These figures are rather high and if correct we are confronted with the possibility of detecting a normal amount of sugar in the urine by the more delicate Benedict's solution. If a normal post-prandial hyperglycemia may rise as high as .17 per cent and the urinary sugar corresponds, normal individuals should frequently show a positive Benedict's reaction an hour or so after a heavy meal. Dr. Margaret Warwick assures me this is not her experience and that an isolated positive sugar reaction with this test unassociated with a diabetes is of uncommon occurrence. She has called my attention to an interpretation of the Benedict's reaction which I do not find mentioned in the standard books on laboratory technic nor in Benedict's original article. A greenish discoloration of the fluid with an amorphous precipitate she does not consider positive for sugar. A granular precipitate settling to the bottom with a green discoloration is necessary. This point should be emphasized, for this flocculent, stringy precipitate associated with a change of color from blue to green is not infrequently encountered in an aglycosuric urine. It is perhaps needless to add that Benedict's technic must be closely adhered to in questionable cases—that is boiling 5 c.c. of the solution, adding eight drops and again boiling for one to two minutes, after which the solution is allowed to cool for five minutes.

FACTORS AFFECTING CARBOHYDRATE METABOLISM

The liver stores glucose in the form of glycogen when the blood sugar is in excess of the needs of the tissues. When the blood sugar has receded below a certain level glycogenolysis occurs, thus maintaining a blood sugar level normal for that individual. It is not certain how the liver gets the signal whether to store or give out glycogen but it is likely that the pancreas and endocrine glands, notably the adrenal, through their antagonistic actions exert this regulatory influence.

Adrenal.—Stimulation of the adrenals through their sympathetic nerve supply causes an increased output of secretion with a simultaneous elevation of blood pressure and a glycogenolysis in the liver. By this mechanism the muscles receive an increased nutrition.

Various experiments go to prove the effect of the adrenal on the blood sugar. Adrenalin given hypodermically causes a hyperglycemia and may even produce a glycosuria. Repeated injections fail to repeat the effect, which is fair evidence that the failure is due to exhaustion of liver glycogen. No effect is exerted on the kidney threshold. The removal of the adrenal results in a hypoglycemia. In Addison's disease, too, Porges has shown a low blood sugar, which confirms the observations of Eppinger, Falta and Rudinger that a high carbohydrate tolerance exists in this disease.

Nervous System.—Claude Bernard long ago established the fact that a *piqûre* or puncture of the brain in the region of the fourth ventricle produces a glycosuria. A hyperglycemia accompanies this glycosuria. André Meyer found that removal of the adrenal prevented this *piqûre* reaction, thus indicating that stimulation of the adrenal is concerned.

Glycosuria occurs at times with lesions involving the brain such as fracture of the skull, apoplexy, cerebral tumors, meningitis, syphilis of the brain, et cetera. This might be explained as a glycogenolysis, an increased irritability of the brain center in the region of the floor of the fourth ventricle being assumed. Any intracranial lesion may exert an influence on the pituitary gland and, as will be pointed out later, this may explain the associated glycosuria.

Von Noorden holds there is no proof of the existence of a diabetes of purely nervous origin. However, transient glycosuria of psychic or nervous origin is well established. Folin, Denis and Smillie found a slight but appreciable glycosuria in 18 per cent of medical students investigated immediately following examinations. Unfavorable effect of worry on the glycosuria in a diabetic is well known.

The common finding of an elevated blood pressure and pulse on first examination of an individual is rightly interpreted as a manifestation of increased adrenalin output of nervous origin. The coexisting hyperglycemia if sufficient may exceed the kidney threshold, particularly in an individual with a low threshold, and glycosuria result. Here is the logical explanation of the occasional temporary glycosuria encountered in life insurance and routine examinations.

Pituitary.—Disturbances of this endocrine gland have a marked influence on carbohydrate metabolism. Cushing established the relation of the anterior lobe of the pituitary body to skeletal growth and concluded that anterior lobe hypertrophy and hyperfunction result in gigantism in youthful subjects and acromegaly in adults. The posterior lobe of the pituitary has to do with carbohydrate metabolism, hyperfunction apparently lowering the tolerance and hypofunction markedly increasing it. Glycosuria has been frequently found associated with acromegaly. It seemed probable to Cushing that this disease is first accompanied by hyper- and later by hypofunction of the posterior lobe. In the condition known as dystrophia-adiposogenitalis a marked increase in the carbohydrate tolerance is developed and a hypofunction of both anterior and posterior lobes probably occurs. These individuals are always overweight. Cushing administered patients with acromegaly and dyspituitarism as much as 300 and 400 grams of glucose without a glycosuria resulting.

Glycosuria has been found to follow operative manipulation of the pituitary stalk. The glycosuria accompanying recent cranial injuries in as high as 20 per cent as reported by Ogden and Higgins may be due to an effect on the pituitary. Cushing states that in any case of increased intracranial tension from whatever source there probably occur secondary changes in the hypophysis with gross deformation and functional disturbance. He has shown too that posterior lobe extracts given hypodermically may produce hyperglycemia and glycosuria. Macleod states that extract of the infundibular portion of the pituitary *generally* causes hyperglycemia. The posterior lobe of the pituitary seems to be functionally antagonistic to the pancreas. The similarity of its function to the adrenal is further suggested by the hypertrophy of the adrenal medulla resulting after experimental hypophysectomy or disease of the pituitary.

Pregnancy.—The presence of sugar in the urine during pregnancy is not uncommon. When it exists in the last few months of pregnancy, during lactation, or after weaning, lactose is likely to be the sugar present. Glucose, as indicated by the fermentation test, is, however, not infrequently detected during pregnancy. The explanation is not clear. Erdheim and Stumme, in their examination of the pituitary bodies in 150 pregnant women at autopsy, demonstrated a color change from grayish red to white and substantial increase in the average size of the gland, more marked in multiparæ but very definite in primiparæ. Presumably this hypertrophy should be accompanied by hyperfunction and hyperglycemia which would explain a glycosuria. However, Rowley found the average fasting blood sugar normal in pregnancy while Gray reports in 51 cases a normal fasting blood sugar and a normal rise but rather prolonged blood sugar curve after ingestion of glucose. This does not coincide with the conception that hyperfunction of the posterior lobe of the pituitary and the resultant hyperglycemia account for the occasional glycosurias encountered in pregnancy. Frank has shown a lowering of the kidney threshold for sugar during pregnancy. This observation has been made the basis of tests for early pregnancy. One hundred to 150 grams of glucose are given on a fasting stomach and the urine and blood tested in 45 minutes and again in an hour and a half for sugar content. Sugar in the urine with a blood sugar within normal limits is taken as in-

dicative of pregnancy. The test it is claimed is not sufficiently accurate for clinical use except in the first three months of pregnancy. The fact that glycosuria occurs in 40 per cent of glucose tolerance tests using a very similar technic makes it highly improbable that such a functional test for pregnancy will prove of clinical value.

The lowering of the kidney threshold for sugar and the proven pituitary change in pregnancy strongly suggest a relation between the two. Perhaps the pituitary is the regulator of the kidney threshold, hyperfunction lowering the threshold.

Thyroid.—The thyroid gland affects carbohydrate metabolism much the same as the pituitary. Clinically we classify disturbances of the thyroid as well as the pituitary as due to hyper-, hypo- and dysfunction. Borderline cases cannot always be defintely classified. Thyroidectomy has been found to be followed by enlargement of the pituitary, suggesting similarity of function.

In general, hyperthyroidism is accompanied by lowered carbohydrate tolerance. Hopkins has shown blood sugar curves in hyperthyroidism rather typical of diabetes. Hamman and Hirschman found the curve to some extent presenting the high sustained and prolonged features found in diabetes in five cases examined. All five cases showed glycosuria during the tests, one in large amount.

A high carbohydrate tolerance has been considered characteristic of hypothyroidism. Increase in weight is a frequent symptom in this condition.

Several instances of the production of glycosuria by oral administration of thyroid extract have been reported. Garrod found glycosuria in a youth who had been given 5 grains of thyroid daily for six weeks. The sugar disappeared after the medication was stopped.

The internal secretion of the thyroid may be considered antagonistic to the pancreas and in overactivity likely to produce a slight elevation of the blood sugar curve as shown in the usual functional test. Hyperthyroidism therefore should be excluded before interpreting a blood sugar curve.

Drugs.—The long list of drugs which are said to produce a glycosuria is rather startling. Garrod lists morphine, atropine, strychnine, curare, amyl nitrite, copaiba, phosphorus, bichloride of mercury, uranium salts, phloridzin and acetone. Phloridzin is doubtless the best known of those mentioned and produces a glycosuria not by an elevation of the blood sugar but supposedly by its toxic action on the kidneys. Morphine produces a hyperglycemia probably through stimulation of the adrenals. It has been shown by Stewart and Rogoff that this action of morphine can be counteracted by insulin. Phosphorus and hydrazine exert a toxic action on the liver cells, producing a glycosuria.

Anesthetics.—The anesthetics, ether and chloroform, are capable of producing a glycosuria. In etherization the hyperglycemia increases according to the degree of etherization and may be prevented by insulin. Insulin if given some time in advance of an anesthetic will prevent this hyperglycemia in smaller dosage than is required to clear up a hyperglycemia once established. The indication in diabetics undergoing anesthetization is clear.

DIABETES MELLITUS

In the light of our present knowledge diabetes mellitus may be defined as a persistent abnormality of the carbohydrate metabolism caused by a diminished function of the islands of Langerhans of the pancreas, characterized by inability of the body to store and utilize glucose, resulting in a hyperglycemia with or without glycosuria.

The pathology commonly associated with diabetes is a hyaline degeneration and atrophy of the islands of Langerhans. The kidneys show at times a peculiar hyaline degeneration in the epithelium of the straight tubules which Ehrlich proved consisted of glycogen deposits. The liver commonly contains less than the normal amount of glycogen, depending on the severity of the disease. This failure on the part of the liver and muscles to store glycogen and the failure of the tissues to utilize glucose are the two outstanding characteristics of diabetes.

In diabetes the normal conversion of glycogen to glucose and of lactic acid to glucose persists, but the normally reversible character of these reactions, that is, the glucose to glycogen and glucose to lactic acid, is interfered with. Just why the glucose molecule is not utilized is not known. The defect lies apparently somewhere in the process of the conversion of glucose to lactic acid and therefore is not an oxidative defect. Shaffer thinks it likely that there is a failure of conversion of the alpha and beta glucose to the gamma form, the forms differing in their optical rotation. In diabetes the blood sugar does not show the low optical rotation found normally. Insulin corrects this.

It is known that the burning of fat in the body is dependent on the burning of sugar. Acetoacetic acid must combine with a product of the oxidation of glucose before it can be itself oxidized. There is some evidence that the acidosis in diabetes may be sufficient to prevent the normal rotation changes of the blood sugar and further prevent glucose utilization. However, attributing failure in the utilization of glucose to acidosis is putting the cart before the horse.

The discovery of insulin has been of assistance in throwing light upon some of the problems associated with carbohydrate metabolism. Insulin raises the respiratory quotient, lowers the blood sugar and increases the glycogen content of the liver. It seems to act quantitatively and will lower the blood sugar in a normal as well as a diabetic. It may produce a profound and prolonged fall in blood sugar if no glycogen is available, while the reaction may be transient if glycogen is available. The application to the treatment of severe diabetes with little available glycogen is apparent. Insulin shock will occur experimentally whether the liver has been removed or not—an indication that tissue utilization rather than liver storage is mainly responsible for the lowering of blood sugar.

Von Noorden has stated that the acute infections such as angina, influenza, measles and scarlet fever have an etiological bearing.

Joslin found a family or hereditary history in 21 per cent of his cases and obesity present in 40 per cent. He has recently expressed the opinion that the high incidence of diabetes in the Jewish race is due to obesity rather than nationality. Beeler and Fitz investigated the carbohydrate tolerance in individuals overweight in an effort to show them prediabetics. Their results were disappointing in that the blood sugar curves were nearly normal in the majority of cases. No prediabetic tendency in fat individuals as a whole was proven.

Arteriosclerosis is frequently associated with diabetes. It is commonly of the senile type and Joslin calls attention to the absence of arteriosclerosis in the severe acute forms under fifty years of age. In elderly individuals the relation of the arterial change to the diabetes is much the same as its relation to nephritis. Sometimes it seems the cause and at other times the effect.

The structural change commonly found in the pancreas in diabetes suggests a previous pancreatitis and yet very rarely can the diagnosis or even a suggestive history of a pancreatitis be associated with a diabetes. On the contrary according to Garrod glycosuria is rare in a grave pancreatitis. He cites a case reported in 1909 by Barberi of a boy six years old who six days after the development of mumps experienced a severe epigastric pain, presumably due to a pancreatitis, which was followed by a temporary glycosuria. Von Noorden is of the opinion that a lowered tolerance in febrile conditions is due to toxic action on the pancreas.

The intimate association anatomically of the biliary system and the pancreas suggests a causal relation. An occasional instance has been reported of temporary glycosuria following a catarrhal jaundice. Lichty, in a review of 23,464 patients, found 1,474 with gallbladder and duct disease, in only six of which was the existence of both diabetes and biliary tract disease verified. In three of these six cases the diabetes apparently was cured following operation for cholecystitis. It is well to bear in mind then the possible though rare etiological relation between the two diseases.

GLUCOSE TOLERANCE TESTS

In the interpretation of the commonly used glucose tolerance test it must be recognized that the motility of the stomach and intestinal absorption is a very variable factor. Fitz and his co-workers recovered 22 to 68 per cent of the ingested glucose from the duodenum and stomach by means of the tube one hour from the time of ingestion.

In an effort to obviate this variable factor Woodyatt, and Wilder and Sansum tested the carbohydrate tolerance by the introduction of glucose solutions intravenously. They concluded that sugar is normally utilized when it is given at the rate of about .8 gram per kilo body weight per hour. Above this rate glycosuria occurred, indicating that the limit of tolerance had been surpassed. In diabetics tested, glycosuria occurred before this rate was reached. In five cases of exophthalmic goiter a reduction in tolerance was also found. Normal assimilation was determined by Wilder and Sansum in one case of hypothyroidism, two of acromegaly, one of gigantism and two of dyspituitarism. They suggested that a delayed intestinal absorption in these last mentioned conditions accounted for the apparent high tolerance reported by others using the oral route.

Rigler and Ulrich have reported a technic which

consists of the intravenous injection of a sterile 20 per cent solution of glucose in such amount that .33 grams of glucose per kilo body weight is administered in ten minutes. Fasting blood sugar and determinations 5, 30, 60 and 120 minutes after the injections are made. The cases so far reported indicate that this method gives accurate information regarding glucose tolerance, the variable factor of gastro-intestinal absorption being eliminated. A sufficient number of cases have not as yet been reported for the establishment of standards.

Several objections may be raised to the above mentioned intravenous technics. Intravenous injections carry with them certain hazards and are rather complicated. The nervous effect on the blood sugar must be enhanced. The delay of the glucose in reaching the liver, however, is not a variable quantity and is no objection to these methods.

The test most commonly used and therefore the best standardized is the one described by Hamman and Hirschman in which 100 grams of glucose is administered in 500 c.c. of lemonade after an overnight fast. The blood sugar and urine are tested before the glucose is taken and in one-half, one, two and three hours. The remarkable accuracy of the Lewis and Benedict technic for blood sugar determinations recommends it for general use although there is only slight variation in the figures reported with the different technics. The desirability of a uniform technic should be emphasized.

The normal fasting blood sugar varies in different individuals. Joslin places it between .06 and .11 per cent, using the Lewis and Benedict technic. Reports by various authors place it between .04 and .12 per cent. Gray collected the reports on 431 normals and found the average fasting blood sugar .09 per cent with .10 per cent the most common.

In 300 normal cases collected by Gray the average blood sugar curve after 70 to 100 grams of glucose according to the above mentioned technic ran .09, .14, .12, .11, and .09. (See chart.) The normal variation was considerable, maximal figures reading .16, .23, .28, .26, .17. The above mentioned average curve may be taken as typical. It is interesting to note that 41 per cent of the three hour readings in these 300 normal cases were above the average figure .09 per cent.

In 129 normal individuals Gray found that 40 per cent developed a glycosuria after ingesting 100 grams of glucose and thinks the percentage would have been even higher had more specimens been tested. This is an interesting observation in view of the statement made by von Noorden in 1905 that the normal individual tolerates 150 to 200 grams of glucose without showing a glycosuria. The more delicate reagents now in use, Benedict's in particular, may account for this lack of agreement.

The most important blood sugar readings are the fasting and the half hour reading after the ingestion of the glucose inasmuch as the maximum figure is generally reached in a half hour in normals. Hamman and Hirschman, however, consider the duration of the curve of more significance than the height.

Our conception of kidney threshold for sugar has been recently somewhat modified by the demonstration of sugar in the urine normally to the amount of about one gram in the twenty-four hours. The amount, according to Bailey, varies with the blood sugar. Benedict has coined the term glycuresis to designate sugar in the urine above the physiologic amount and he considers glycuresis a normal kidney function.

In diabetes the blood sugar curve shows certain variations depending on the severity of the case. In the severe or moderately severe cases the fasting blood sugar is above the .11 usually considered the upper normal limit and the curve runs much above the normal throughout.

In mild diabetes, however, the interpretation of the blood sugar curve may not be conclusive. Gray collected 131 cases of uncomplicated diabetes forty of which showed a fasting blood sugar of .11 or under. The average blood sugar curve of these forty cases was .09, .16, .20, .15, .10. (See chart.)

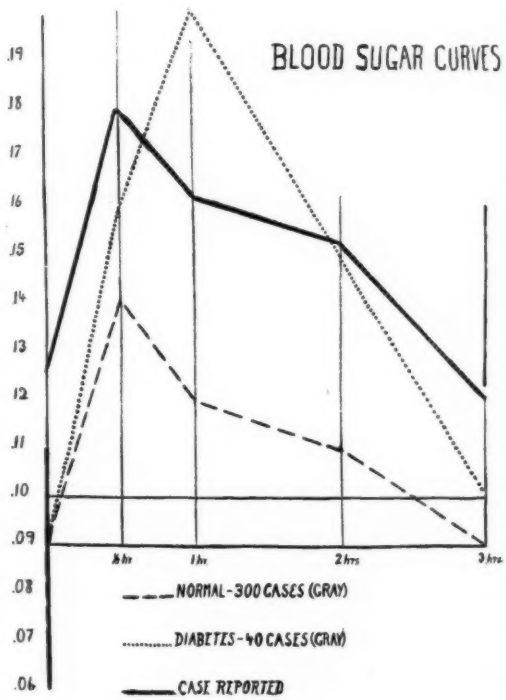
It may be concluded then that a mild diabetic shows on the average a blood sugar on the half hour and hour distinctly higher than the normal with the additional characteristic that the hour reading is higher than the half hour. The average curve in mild diabetes shows also a delayed return to the fasting point, the two hour reading being distinctly high. In this series of mild diabetics mentioned it should be noted that the average three hour reading was nearly the average starting point. In mild diabetes then the three hour reading is

not enough higher than the fasting blood to be significant.

Emphasis must be laid on the fact that the individual curves which go to make up these average curves which are taken as typical, vary widely. Curves vary with the absorption and this factor is decidedly variable. Each laboratory should establish normal standards with its particular technic for comparison.

While a tolerance test in which the oral administration of glucose is used may be of assistance in making a diagnosis, a diagnosis based on the blood sugar curve alone is not justifiable.

Reports of the blood sugar curve after 100 grams of glucose in cases of nephritis show in some instances a typical diabetic curve. Hopkins reports that three of four cases tested showed a marked hyperglycemia with a sustained peak and slow fall. Hamman and Hirschman find this same



reaction in some of their nine cases and attributed the absence or only slight amount of sugar excreted with the hyperglycemia, to deficient kidney function. In nephritis complicating diabetes the renal threshold is often raised for some unknown reason. This accounts for the rather common experience of an improvement in the glycosuria with the development of a nephritis complicating a diabetes.

The following case is illustrative:

Mrs. M. J. J., aged 67, colored, was admitted to the Ancker hospital in April, 1924. She presented the typical picture of cardio-renal disease with orthopnea and generalized edema. The blood pressure was 210/80, pulse 70 to 80. The urine ranged in specific gravity from 1014 to 1026 and was loaded with albumen and hyaline casts. No sugar was present on repeated examination. The blood sugar was .22, .25, and .21 per cent on three different occasions.

Her hospital chart of a former admission to the same hospital five years before showed that she had had at that time a persistent glycosuria and the usual subjective symptoms of diabetes. An infection of her foot which took two or three years to heal was also present.

This patient was too ill to permit a glucose tolerance test. She undoubtedly had had diabetes and the presence of a nephritis accounted for the high threshold. The persistent hyperglycemia shows that the diabetes was still present. The diagnosis of diabetes might well have been overlooked in this case had the previous hospital record been lacking. While a deficient kidney might account for a delay in the return of a hyperglycemia to the fasting level it could scarcely account for a fasting blood sugar higher than the normal. It seems likely that some at least of the cases of nephritis which have been reported with a fasting blood sugar higher than normal are instances of both diabetes and nephritis.

RENAL GLYCOSURIA

The existence of a persistent glycosuria due to increased permeability of the kidney to glucose, or in other words due to a lowered renal threshold, has only recently been established. As late as 1912 von Noorden refused to recognize the condition. With the development of routine blood sugar estimations numerous authentic cases have been reported.

In 1896 Klemperer reported a case and stipulated that to justify such a diagnosis the glycosuria must be independent of food carbohydrate and the blood sugar normal.

Luthji in 1901 believed a coexistence of a nephritis was a requisite. Since then it has been shown that a nephritis often raises rather than lowers the renal threshold for sugar.

In the diagnosis of a renal glycosuria Strause offered the following postulates: (1) a glycosuria without hyperglycemia; (2) glycosuria more or less independent of carbohydrate intake; (3) absence of diabetic symptoms; (4) no subsequent development of diabetes. Paullin added (5) sugar constantly present in the urine.

Graham has described two types of renal glycosuria, one in which less than 10 grams of sugar are passed in twenty-four hours and the other in which 10 to 30 grams are passed. He at first laid down two postulates: (1) that the blood sugar must be within normal limits, and (2) that sugar must always be present in the urine. Later he described a third type of renal glycosuria in which the fasting blood sugar and blood sugar curve are within normal limits but where glycosuria occurs only after a carbohydrate meal.

This third type includes the individuals who are so difficult to classify. They have none of the subjective symptoms of diabetes, the blood sugar is within normal limits and glycuresis occurs only when the physiological alimentary hyperglycemia within normal bounds rises in excess of a renal threshold lower than the average. Close scrutiny of a blood sugar curve is necessary to detect what accounts for the glycuresis; whether the abnormality is due to a poor handling of the carboydrate suggesting diabetes or whether a threshold lower than average accounts for the glycuresis.

The following borderline case is briefly submitted:

W. M., aged 37, physician, was refused life insurance in January, 1924, because sugar was detected in the urine. He had never had any subjective symptoms of diabetes.

A paternal uncle had died of diabetes at the age of 62. His father was suffering from pernicious anemia at the time and several years ago had shown sugar in the urine although not in recent years. He is a hearty eater and fond of carbohydrate food; a heavy smoker, he uses alcoholic beverages only occasionally.

In childhood he suffered from the usual contagious diseases, which included mumps, scarlet fever and measles. In 1919 he suffered from a mild attack of influenza.

One peculiarity which he has noticed since childhood is the tendency to flush very easily, sometimes on apparently no provocation.

Examination showed a well built male, 5 feet 10 inches in height weighing 202 pounds. His weight was well carried. Pulse, temperature and blood pressure were normal and there was no indication of arteriosclerosis. The hair was prematurely gray-streaked, this being a family characteristic, his father and mother both having become gray in middle life. A slight arcus senilis was apparent.

The urine passed in the early afternoon showed a trace of sugar (.5 per cent on fermentation) and no albumen.

On repeated examination of specimens passed in the morning no sugar was ever detected. One hour after an ordinary meal at noon consisting of meat, potato, a slice of bread, coffee with sugar and a piece of pie, a fraction of a per cent of sugar was repeatedly detected in the urine.

A tolerance test using 100 grams of glucose after an over night fast showed a blood sugar curve of .126, .180, .162, .153, .120 with 1.5 and 1.7 per cent sugar in the urine one and two hours respectively after the ingestion of the glucose. (See chart.) Sugar appeared when blood sugar ranged from .180 to .162 and on the down curve between .162 and .153 per cent.

Moderate dieting reduced this patient's weight from 202 to 180 pounds and the sugar failed to appear after a noon meal which previously produced it.

The possibility of an abnormally sensitive sympathetic system being responsible for the glycosuria in this case was considered but ruled out on the lack of relation between the sympathetic manifestations and the glycosuria.

The blood sugar curve is within the normal limits established at the laboratory where the test was carried out, although the fasting blood sugar and the curve as a whole are higher than the average of curves elsewhere reported. The two hour reading of .153 per cent is rather high but the return to the fasting level occurred in three hours. Glycosuria present when the blood sugar ranged between .162 and .153 on the down curve does not necessarily indicate a low kidney threshold as glycosuria has been found to occur at a somewhat lower level on the down curve in these tests than on the up curve.

Here, then, is an individual showing a glycosuria only after an ordinary carbohydrate meal, where apparently the alimentary hyperglycemia surpasses a renal threshold which is normal or possibly slightly below the average. The individual is overweight and there is a family history of diabetes.

A positive diagnosis in such a case as the one cited is not possible. The failure to demonstrate a definite lowering of the renal threshold for sugar does not permit a definite diagnosis of renal glycosuria. The glycosuria following an ordinary carbohydrate meal certainly indicates a lowered tolerance and in the absence of any abnormalities which might affect carbohydrate tolerance suggests a mild diabetes. The indication for treatment is very definite. The diet should be reduced in carbohydrate sufficient to control the glycosuria and

overweight should be avoided. This treatment has so far remedied the situation in this case.

The future course of this patient may clear up the diagnosis. Not necessarily, however. If our conception of diabetes is correct a little care in the diet may well prevent the development of a frank diabetes and the diagnosis ten years from now may be just as uncertain as at present.

It has been my purpose to show that carbohydrate metabolism is a complicated affair and subject to a regulation by a delicate balance of numerous factors. The interpretation of glycosuria depends on a careful consideration of the clinical picture presented by the individual.

SUMMARY

While a diabetes of purely nervous origin does not exist a temporary hyperglycemia and glycosuria may result from nervous stimulation of the adrenal and consequent glycogenolysis.

Glycosuria is frequently associated with dysthyroidism and dyspituitarism.

There is probably a causal relation between the hypertrophy of the pituitary and the frequent presence of glucose in the urine in pregnancy.

Renal glycosuria probably exists where there is only slight lowering of the renal threshold for sugar and where the glucose appears in the urine only accompanying a normal postprandial hyperglycemia.

The usual glucose tolerance test is quite inaccurate because of individual variation in gastrointestinal motility and absorption.

An appreciable percentage of normal individuals show a glycosuria following the ingestion of 70 to 100 grams of glucose.

Blood sugar values in the glucose tolerance test commonly employed show marked variations in the normal.

Pronounced cases of diabetes or renal glycosuria may be readily differentiated by the usual glucose tolerance test.

A blood sugar curve within normal limits does not exclude a *mild* diabetes.

We have no method of absolutely differentiating mild diabetes from renal glycosuria with only slight lowering of the renal threshold for sugar.

The term prediabetic or potential diabetic is justified in describing the borderline cases not shown to be definitely renal glycosuria. Dietary restriction in these cases will control the glycosuria and is definitely indicated.

Glycosuria may rarely result from gallbladder infection and resultant injury to the pancreas.

It is likely that a certain number of diabetics with accompanying nephritis and resultant elevated kidney thresholds for sugar are overlooked.

While we do not know the cause of diabetes there is evidence to show that overstimulation of the islands of Langerhans by excess of carbohydrate ingestion may be a causal factor in an individual whose pancreas is below par either congenitally or as a result of infection.

Our hope of preventing diabetes lies in the prevention of acute infections, the control of overweight and the early detection of glycosuria.

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DISCUSSION

DR. ULRICH: Dr. Drake mentioned some work Dr. Rigler and I did on this subject. We were trying to standardize the blood sugar curve. We called attention to the fact that the "glucose tolerance test" is not a good term. We called it blood sugar reaction following the injection of glucose. We tried to get some sort of a quick, accurate method to determine this curve. At the present time that work has not been finished.

This thesis covers quite a tremendous territory. It includes not only glycosuria, but glycemia and diabetes.

I have taken the blood sugar on every patient who is given a thorough examination in my office, and find a large percentage of these have hyperglycemia. These people are not diabetics. All diabetics are ruled out. They come with all sorts of symptoms, particularly complaining of vague pain. They improve on mild dietary measures.

DR. SCHLUTZ: The peculiar greenish-yellow color given by some urines, if tested with Benedict's reagent, is probably due to pentoses. Patients on a diet consisting largely of vegetables often give this reaction.

Prof. Folin, in a recent article on carbohydrate tolerance, mentions the effect of excitement upon blood sugar and finds that it easily causes an increase. We are now carrying out some experimental work along similar lines in children, but so far have not observed this influence. It is possible that the psychic reactions of the child may not be as sensitive or profound as those of the adult.

DR. FREEMAN: I would like to mention a very simple and accurate test for sugar in urine that Dr. Eduard Boeckmann showed me about twenty years ago. An ordinary test tube is filled three-quarters full with the urine to be examined. About 5 c.c. of a saturated solution of sodium hydrate is added. The thumb is placed over the opening and the test tube is inverted so as to mix the liquids. The upper part of the column of the fluid is then gradually heated over a Bunsen burner. In positive cases a chocolate-brown color appears at the top in the heated area of fluid.

DR. GILFILLAN: My understanding was that theses were not discussed. The paper is very interesting and I think one of the things to be learned is that we have no absolute test for diabetes. In the case mentioned by Dr. Drake, of a physician who had glycosuria and somewhat doubtful blood sugar curve, I don't think we can tell whether or not he has diabetes.

I think renal glycosuria is not so uncommon as we used to think. I see cases now who pass sugar on a blood sugar of 0.12 or 0.13, but that is not diabetes. Then there are cases we see with high blood sugar who do not pass sugar. I don't think that is diabetes. They are utilizing sugar; they are running a high blood sugar, but they are using all the sugar or it would accumulate.

Then there is the relation of that to some other diseases; for instance, the relation of high blood sugar to furunculosis, cataract and some other eye diseases. In many of those cases high blood sugar is found, but not diabetes.

Of course, in diabetes the effect of hyperglycemia itself is somewhat doubtful. The hyperglycemia itself does not

produce serious direct manifestations of diabetes. All of the efforts made to differentiate true diabetes from those conditions has led to no results so far. Ordinarily, diabetes is a progressive disease. I should say, in the case reported, if in ten years we found that curve the same, we could not say he had diabetes. If it progresses, it is diabetes, but if it stays the same we can not tell.

I don't think, in renal glycosuria, that the glycosuria is independent of diet, either. Some may have a threshold of 1.1 or of 1.5; the latter would secrete sugar possibly with ingestion of carbohydrate and the other without the ingestion of carbohydrates. We see a great variation in the threshold both in diabetes and in health.

In the case described, the curve shows slow utilization of sugar in the body, but the sugar is utilized, so it is not diabetes so far as we can tell.

DR. HALL: I think this is a very important paper. We very frequently see cases in which the urine shows a small amount of sugar at times only, with a blood sugar about the borderline. It is difficult to know how to classify these cases. The metabolism of sugar is an intricate process which is influenced by so many factors. Insulin appears to affect the metabolism of sugar from whatever cause, but we know very little as to how insulin really brings this about. In the presence of an infection it certainly is not nearly as efficient as in other diabetics.

There appears to be some evidence that inefficient Islands of Langerhans may improve. In one case cited by Dr. Drake, the man's organism apparently handled a diet normally which had formerly produced glycosuria. We see this very frequently in dieting diabetics. After they have been dieted for a time they take care of an amount of carbohydrates which they were previously unable to handle. In the early part of this year the Banting group obtained an autopsy, in a few hours after death, on a child who had been killed in a street accident. This child was one of their first insulin cases. At autopsy they thought they found evidence of regeneration in the Islands of Langerhans. This is an interesting observation.

There is no way to be sure how we should class such a case as Dr. Drake cites. I do not believe the glucose test is of great value. I think it best to consider him a potential diabetic.

DR. DRAKE (in closing): The last case I reported led me to investigate this subject. Dr. Gilfillan had seen the case and felt it was not diabetes, and another internist said it was. I did not know, so I started investigating, and when I got through I had to come to the conclusion that still I did not know.

If we can follow Joslin, this is the type of case we can hope to do something with, in the prevention of diabetes. If it is overworking the Islands of Langerhans that has to do with the causation of diabetes, then regulating the diet and keeping down overweight is the most we can do in the way of prevention.

IRREGULARITIES OF RESPIRATION*

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HISTORICAL

Irregularities of respiration have been noted from time to time by various authors. Aducco[1], by animal experimentation, found that complete paralysis of the entire respiratory apparatus, with the exception of the diaphragm, was made possible by the production of diffuse embolism of brain and bulb. Under these conditions the diaphragm alone was insufficient for the needs of the dog, so that artificial respiration was required. The diaphragmatic contractions could be arrested by stimulation of the crural nerve, probably through an inhibitory center.

Jackson[2] reported a pneumonia case in which the intercostal muscles remained inactive unless the patient was given a command to breathe. As the patient recovered, the intercostals again functioned normally. Jackson thought that the condition might be the result of a limited myelitis in the thoracic region of the cord.

Micheleau[3] reported a case of tuberculosis in which each inspiratory movement was accompanied by a lowering of the larynx with substernal retractions and marked depression of the seven last intercostal spaces, while the abdominal organs were pushed aside by the diaphragm. At autopsy it was found that the two layers of the pleura were adherent at the level of the diaphragm and the lower part of the thorax.

Grocco[4] described a type of respiration characterized by a more or less marked dissociation of contraction of diaphragm and of intercostal muscles, to such a degree that while the expiratory phase of the former was in progress, the beginning of the inspiratory phase of the latter occurred, or vice versa. Grocco thought that the term ataxic could be applied, since physiological co-ordination was profoundly disturbed. The dissociation was sometimes transient and sometimes of long duration, and usually indicated a serious prognosis. This type of respiration was observed in meningitis, cerebral tumor, cerebral abscess, cerebral hemorrhage, typhus fever, pneumonia, uremia, and occasionally in cardiac disease.

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Frugoni[5] observed dissociated respiration in a woman during operative chloroform narcosis. There developed at first an irregular respiration, then dissociated respiration for several minutes, and finally a complete apnea. The condition was removed only by suspension of the operative intervention, and the administration of artificial respiration. This indicated a functional disorder of the bulbar centers.

Frugoni[6] recorded respiratory movements by means of two Marey pneumographs, one at the level of the manubrium and one on the abdomen, in a fatal case of meningitis. The diaphragm was active, but the thorax was completely paralyzed, being moved passively to a slight extent.

The same author[7] published a record in which a rhythmic diaphragmatic respiration was accompanied by an arhythmic costal respiration. This record shows a few respirations of the sighing type, in which the diaphragm and the intercostals acted together. In all the other respirations there was dissociation, in which the diaphragmatic inspiration was accompanied by intercostal expiration. In Graph VII, page 463, a persistent arhythmia is shown, with a tendency to periodicity. The excursions of the left thorax were greater than those of the right thorax. The same condition is emphasized in Graph 8, page 464, which shows tracings taken from the epigastrium, and from the left and right second intercostal spaces. A brief history is given, stating that the patient was a heavy drinker, and had suffered from spasms of the larynx for two years. At times there was shortness of breath, dyspnea, cramps of the extremities, epigastric pain and eructations. The dissociation of respiration disappeared during sleep and was accentuated during the waking hours by cold, fatigue and emotional states. Frugoni made records of the type of respiration described by Grocco, and agrees with the latter in the seriousness of prognosis. He realized that morphine may exaggerate a Cheyne-Stokes type of respiration or initiate a periodic type.

Conner[8] recorded respirations, using two Marey pneumographs, one about the thorax at the level of the third rib, and the other about the abdomen, midway between the ensiform and the umbilicus. The type occurring often in meningitis showed periods of apnea, varying in length, and occurring at irregular intervals. He observed a constant irregularity in rhythm, and in the force of the individual respirations in such cases, and thought that it might be due to an involvement of the root of the glossopharyngeal nerve in the inflammatory process.

Warren[9] studied a case of bronchial asthma, in which the diaphragm moved but slightly, and the normal order was reversed. He thought it possible that the excessive thoracic movements exerted a pull on the diaphragmatic attachments, giving the impression that intercostal inspiration was accompanied by diaphragmatic expiration.

Coleman[10] stated that he has observed asynchronism in many severe cases of lobar pneumonia during the past twenty years. In this type, there is a separation of the contractions of the diaphragm and intercostal muscles by a definite, but variable, time interval. In well developed cases, the abdominal wall reaches the expiratory phase before the intercostals begin to contract. Asynchronism was noted by him only in cases of lobar pneumonia, and indicated a serious prognosis.

The same author[11] again described asynchronism, and suggested possible causes for the condition.

Hoover[12] attacked Coleman, stating that the movements of the thorax so described indicate an enlarged heart. Coleman[13] defended his position, showing records of the type he had formerly described. In the type described by Hoover there was no asynchronism. The muscles all contracted together, but the sternum was depressed during inspiration, owing to a distortion of the thoracic cage. No delay occurred.

EXPERIMENTAL

Interest in this subject was aroused by the Coleman-Hoover controversy. Dr. Henry L. Ulrich suggested that observations be made in the wards of the Minneapolis General Hospital, and he later made the necessary arrangements. The method employed was extremely simple. Two rubber bags (from sphygmomanometers) were fitted into muslin covers, to which was attached a long strip of muslin which could be wound about the patient's body two or three times. One tube of each bag was attached to a bulb as in blood pressure determinations. The second tube of each bag was attached to a tambour by means of pressure tubing. The movements of the tambour levers were recorded on a smoked surface, the upstroke indicating inspiration, the downstroke expiration. One bag was placed about the thorax as high as possible under the arms, the other about the abdomen over

the umbilicus. Thus the upper tambour recorded intercostal activity and the lower diaphragmatic activity. The time in seconds was recorded by means of a metronome and signal magnet. The apparatus was placed on a small table which could be wheeled to the bedside so the patient was not disturbed by the record-taking. The records should be taken without the influence of conscious efforts on the part of the patient. The patients appeared to enjoy having records taken and practically no objections were encountered at any time, hence we believe that the method is applicable to routine clinical procedure.

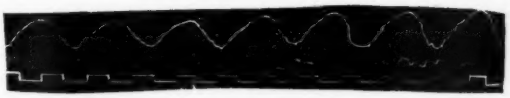
RESULTS

Many types of pathological cases were studied together with a large number of normal cases. In analyzing the tracings, especial attention was paid to the time relations. In all cases of normal breathing the time periods of the intercostal and the diaphragmatic contractions were the same. In many cases of pathological breathing, we found variations in the time relations. The tracings furnish information regarding time, rate, and sequence, as do venograms and arteriograms.

Tracing I

Tracing I shows the respiratory movements in a normal subject.

Tracing II



Tracing III

Tracings II and III were taken from a boy, 17 years old, with chronic adhesive pericarditis. The thoracic respirations are much deeper than the diaphragmatic in both cases. When Tracing III was taken the patient was lying back on the pillows, so the respiratory movements are less extensive than in Tracing II, during which the patient was sitting up. These records are interesting because the diaphragm was observed to move very slightly when the patient was placed under the fluoroscope. It was encouraging to have a means of checking the impression gained from the respiratory records, that owing to the adhesions the diaphragmatic excursions were greatly decreased. The time relations were normal. The rate in II was 20 per minute, and in III, 22 per minute. There was pain in the precordium which became worse on deep inspiration.

Tracing IV

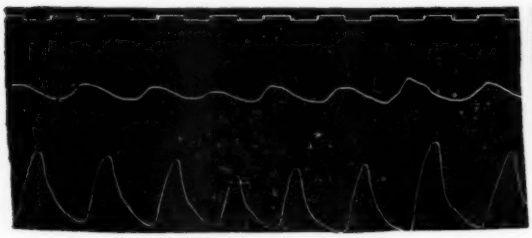
Tracing V

Tracings IV and V were taken from an 18-year-old girl suffering from asthma. Both records show a decided thoracic expiratory prolongation. In Tracing IV the abdominal record suggests that the diaphragm attempts a second contraction during the prolonged thoracic expiration (rate 18 per min.). This attempt is absent in Tracing V, in which the rate was 21 per min.

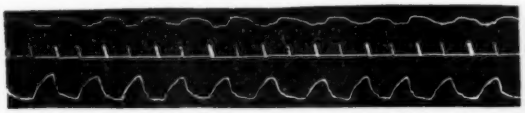
Tracing VI

Tracings VI and VII were taken from a man about 28 years of age, who was diagnosed as a case of lethargic encephalitis. Tracing VI shows a peculiar type of respiration, in which the tho-

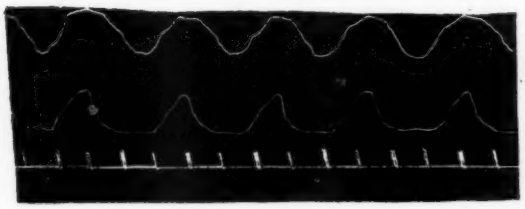
racic is poorly developed, and the abdominal shows a tendency toward a second inspiratory effort during expiration, resembling in appearance the dicrotic notch of a radial pulse tracing (rate 38 per min.). Tracing VII was taken one month later. The thoracic movements are fairly regular and the tendency to the secondary inspiratory effort during the diaphragmatic expiration is less marked. The rate was 32 per minute.



Tracing VII



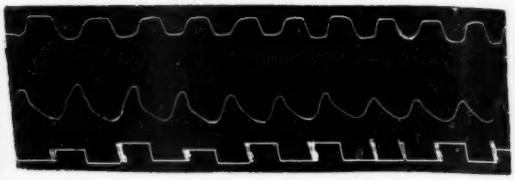
Tracing VIII



Tracing IX

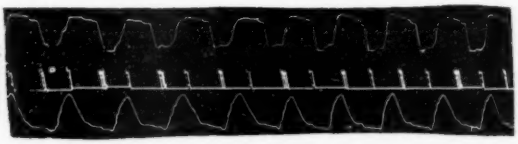
Tracings VIII and IX were taken from a nurse in training, about 20 years of age. Her case was first diagnosed as pneumonia and her respirations were noted from day to day. In Tracing VIII, asynchronism may be noted. As the diaphragm is just beginning to relax, the intercostals are beginning to contract. This was considered serious and a more thorough examination revealed a marked pleural effusion. After this was withdrawn, the patient began to improve. The rate was 30 per minute. Tracing IX was taken four weeks later and it shows that asynchronism has disappeared and the rate was 22 per minute.

Tracing X was taken from a man 43 years old with a diagnosis of influenza. The patient died, the cause of death being given as pulmonary edema. Again asynchronism is noted, the contractions of the intercostals beginning as the relaxation of the diaphragm is beginning. The thorax remains in an inspiratory position, relaxing just before the next diaphragmatic contraction ensues. The patient had used morphine for fifteen years, and was receiving it frequently in the hospital. The rate was 33 per minute.

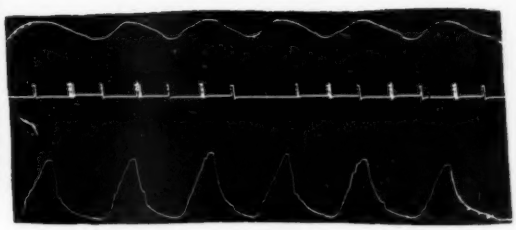


Tracing X

Tracings XI and XII were taken from a man 56 years old with a diagnosis of lobar pneumonia.



Tracing XI

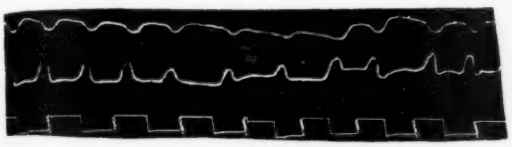


Tracing XII

It will be noted in Tracing XI that there is a prolonged inspiratory effort of the intercostals while the diaphragm is relaxing. The inspirations begin together, but the diaphragmatic is much shorter. This is not asynchronism. Rate 30 per minute. In Tracing XII, taken one month later, the respiratory movements are normal. Rate 18 per minute.

Tracing XIII was taken from a man 63 years of age, whose case was a puzzling one. When he first entered the hospital, there was no asynchronism in respiratory movements, but a prolonged expiratory phase was noted in both the thoracic and the abdominal respirations. Three days later asynchron-

ism was noted, and it was present until death, eight days later. Tracing XIII was taken fourteen hours before death. The movements are very shallow, and asynchronism is shown. By autopsy, diagnoses

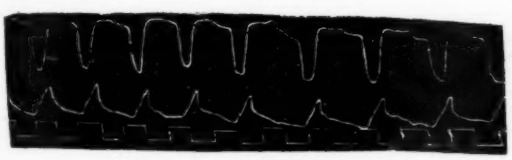


Tracing XIII

of chronic bronchitis, broncho-pneumonia, pulmonary edema and empyema were made. Rate, 44 per minute.

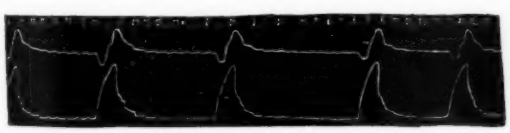
Tracing XIV

Tracing XIV was taken from a boy 18 years of age. His diagnosis was asthma. Prolonged expiration is noted. The thoracic movements are much greater than the diaphragmatic. Rate, 18 per minute.



Tracing XV

Tracing XV was taken from a man 40 years of age with lobar pneumonia. Asynchronism is noted, the thoracic inspiration beginning just as the diaphragmatic expiration begins. As thoracic expiration occurs, the diaphragmatic inspiration begins. This patient died within a few days. Rate, 30 per minute.



Tracing XVI

Tracing XVI was taken from a woman 36 years old. She was a morphine addict. She died shortly after the record was taken, and her death was reported due to broncho-pneumonia. From this tracing it would seem rather to be due to morphine as the rate was extremely slow, being 8-9 per minute.

DISCUSSION

The cause of many of these irregularities remains obscure. Various suggestions have been made from time to time. Aducco,[14] quoted by Luciani, recorded observations which he interpreted to indicate that expiratory centers exist apart from inspiratory centers. These centers may function independently, as shown by the injection of chloral hydrate. In some cases both inspiratory and expiratory centers of the thoracic muscles were thrown out of action, and likewise the inspiratory center of the diaphragm, the expiratory center alone remaining active. In other cases, only the expiratory center for the thoracic muscles remained active, and since the abdominal movements were passive, asynchronism is evident in his records. The mechanism of the action was not understood.

Peabody[15] states that infection is accompanied by a diminished carbon dioxide content of the venous blood during the febrile period. This relation holds in pneumonia, the lowest carbon dioxide content being associated with very rapid respiration. The same author[16] found that in uncomplicated cases of lobar pneumonia the oxygen is within normal limits.

Henderson[17] found that the threshold of the centers for carbon dioxide is raised more than the threshold for afferent nervous impulses by morphine.

Capps[18] studied the pain sense in the pleural membranes. He found that the visceral pleura is not sensitive to pain. In the parietal pleura, the pain is accurately localized. It may be that afferent impulses are responsible for alterations in respiration through their effect on the centers.

Cushny[19] studied the effects of drugs on respiration in decerebrate rabbits. The animals were so placed in a plethysmograph that movements of the thorax could be recorded. He found that 1 to 2 mg. of morphine given intravenously at intervals always slowed the rate of respiration. The response to inhalation of carbon dioxide was markedly reduced. By experiments on the afferent fibers, results were obtained which indicated that

the inhibitory impulses over the vagus were rendered more effective by morphine.

Barbour[20] finds periodic respiration after morphine, which he attributes to a depression of the respiratory center.

Means, Newburgh and Porter[21] studied the condition of the respiratory mechanism in pneumonia. They used cats in their experiments and increasing the carbon dioxide in the inspired air, measured the increase in volume of tidal air in normal cats and in pneumonic cats. Their results are striking. The normal cats showed a marked increase in tidal air with increase in carbon dioxide, while the increase in the pneumonic cats was much less. They conclude that the reaction of the respiratory mechanism to carbon dioxide is greatly diminished in pneumonia.

Newburgh, Means and Porter[22] repeated the above experiments, using dogs. As the disease advanced, the carbon dioxide reaction diminished. They found that section of the vagus nerves prevented the depression of the respiratory mechanism in pneumonia.

Porter and Newburgh[23] suggested causes for the exhaustion of the respiratory mechanism in pneumonia. It may be due to toxins produced by the bacteria, to toxins formed in the lungs, to lack of oxygen, to increase of carbon dioxide, or to impulses over the vagi. They favor the last view, since there is neither dyspnea nor hyperpnea in pneumonia after section of the vagi.

Coleman[11] realizes that there are two factors to be considered, the direct action of the toxin on the nerve cells, and the afferent impulses from the inflamed lung.

So far, the problem of irregular respiration is unsolved. It will require much experimental work. Undoubtedly, morphine may be a complicating factor in some pathological cases, and must be kept in mind.

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THE SURGERY OF HYPERTROPHIC PYLORIC STENOSIS*

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Minneapolis

The term "congenital hypertrophic stenosis of the pylorus" is sufficiently descriptive to require but little explanation.

Historically, although described a century before by Armstrong, the condition first obtained general recognition following the reports of Hirschprung in 1888. In 1905 Ibrahim published his first monograph on the subject and in 1908 was able to collect reports of 400 cases. The publicity thus gained soon made possible an estimate of the frequency of the condition. In 1906 Heubner placed the incidence at .5 per cent and ten years later Hertz noted it as 2.7 per cent in a series of 2,275 infants under one year of age. As to sex, the occurrence has been variously estimated at two and three males to one female. (Sauer, Richter.)

The essential lesion is an hypertrophy and hyperplasia of the musculature of the pylorus, chiefly in its circular fibers. The pylorus appears grossly as a firm, spool-like mass almost cartilaginous in consistency and sharply demarcated from the stomach and duodenum. The mid-portion is white and almost avascular, but at the gastric and duodenal margins the circulation rapidly approaches the normal.

On axial section the pyloric mass is dense and uniform. The circular muscle fibers are increased in number and size, and friable as though undergoing some hyaline change.

The mucosa apparently persists at its normal growth rate and aligns itself in longitudinal folds which further obstruct the already constricted lumen. According to Strauss the degree of obstruction has little relation to the size of the tumor mass which he finds to be smaller in young infants than in those of eleven or twelve weeks.

The stomach is usually distended and its walls hypertrophic although the degree of hypertrophy is dependent upon the length of time during which it has been forced to combat the constriction at the pylorus.

The clinical syndrome developing upon this basis is that of pyloric obstruction with its ensuing train of metabolic disturbances. While many careful observers are at variance as to the average time of appearance of symptoms, reports ranging from a few days to several weeks, all are agreed that directly following birth there is a free interval which gives no intimation of forthcoming events. Thus, when obstruction becomes established in an otherwise normal infant, vomiting commences and soon increases in severity and frequency, being usually explosive and projectile in character. Unlike the vomiting of toxic states, the desire for food is generally present and the attempts of the stomach to empty normally are soon manifested by marked peristaltic waves. Appearing a few days after vomiting is begun, these gastric waves may be taken as corroborative evidence of obstruction and have been experimentally demonstrated (Veeder, Clopton and Mills), but their size and severity are not at all proportionate to the degree of pyloric hypertrophy (Reiche, Sauer). At the time when peristalsis is most marked or shortly after vomiting (Wernstedt, Sauer, Hertz) the pyloric tumor lying deep in the right flank may often be palpated. By some (Richter, Scudder, Downes) it is found in nearly all cases and considerable time and effort are employed in determining its presence or absence, while most others experience some difficulty in palpating a full abdomen and place correspondingly little emphasis on this feature.

It is probable that complete closure of the lumen rarely if ever obtains and that some portion of the feedings passes onward into the intestine, the resulting stool being more scanty than normal. This finding of persistently small bile-stained mucous stools is of the greatest significance, as it at once gives information as to the location and the severity of the lesion. Further evidence may be gained by noting the time at which ingested food is vomited, by measurement of the aspirated content and by fluoroscopic examination.

As little of either fluid or solids is allowed to pass to where it may be absorbed, and as water absorption from the stomach itself is negligible, dehydration phenomena soon appear which if allowed to continue unrelieved result in appalling weight loss, athrepsia and finally exodus.

A further consideration of the points in diagnosis which serve to differentiate the condition from other more or less similar ones is too involved for the scope of this discussion. Let it suffice to say that diagnosis centers about the symptoms of in-

*Read before the Minneapolis Surgical Society, Feb. 5, 1925.

terference at the pylorus, and treatment upon the progress of the patient in overcoming it.

Continued vomiting, accompanied by visible gastric peristalsis and starvation stools, implies failure of the stomach to empty and, if not promptly and effectively relieved by other means, is an indication for surgery.

A strict adherence to this formula would doubtless bring some extreme cases of nonhypertrophic pylorospasm to operation and it seems not unreasonable that this should occur inasmuch as a spastic pylorus is as easily relieved by incision as is the purely hypertrophic constriction.

The amount of time which may be safely expended in observation or dietary treatment is variously estimated. Finkelstein and likewise Rammstedt allow two weeks' observation before resorting to surgery, while Drachter advises operation at the end of four or five days of unsuccessful treatment. Strauss, who reports the lowest surgical mortality, bases his determination chiefly upon the roentgenologic findings. While in his hands this is evidently adequate, most clinicians are governed by the increase or decrease in body weight. Although recovery has been reported following operation after 40 per cent weight loss (Guleke, Berend) any approach to the fatal Quest figure of 30 per cent makes the outcome extremely doubtful. Inspection of the normal infant weight curve makes it plain that a stationary weight is, in effect, a losing weight and as compared to the adult a persistent weight loss really proceeds by geometrical progression.

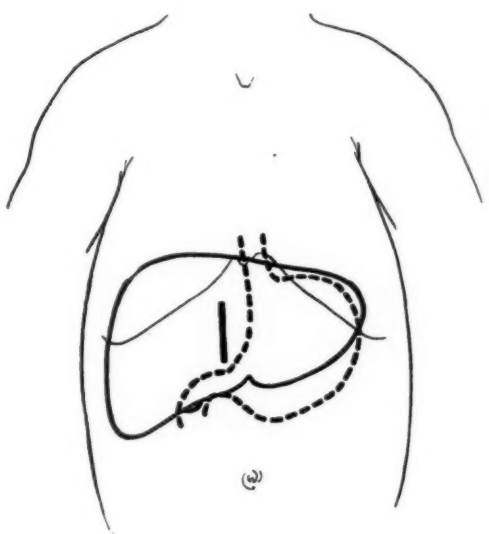
Because of the especial susceptibility of infants to dehydration (Mariott) restoration of tissue fluid and blood volume is the first consideration of preoperative treatment. In the milder cases, water by bowel, or subcutaneously, is sufficient if employed early and freely. In the severe and prolonged states of anhydremia, transfusion (via fontanelle) is necessary to replace the destroyed cells and serum protein (Keith). Because of the blood concentration following fluid loss, hemoglobin estimates made from the capillary blood are misleading and many cases that are given only water would be better off with blood transfusion. In fact it is probable that routine preoperative transfusion is advisable in all, and necessary in most, cases.

The use of sodium bicarbonate is unnecessary in the lesser degrees of anhydremia and is contraindicated in the advanced stages because of its effect on further concentrating the blood and because of the alkalosis which usually occurs as a normal water balance is established (Mariott). For the same reasons the acidosis resulting from fluid loss is better overcome with glucose; this may be administered in 5 or 10 per cent solution not to exceed the limit placed by Woodyatt at 1 gm. per kilo per hour.

Any detailed discussion of types of operations is unnecessary. The divulsion method of Loretta is only of historical interest as is the Heineke-Miculicz pyloroplasty.

Gastroenterostomy, the operation of choice up to 1911, has been definitely discarded as unphysiological and dangerous. Today the generally accepted procedure is that of Rammstedt, either in its original form or as modified by Strauss.

The actual surgical procedure should follow along some definite and well conceived plan. Careful timing will do much to avoid duplication of effort and unnecessary exposure of the patient.



(1) Diagrammatic topography of the infant abdomen showing the visceral relations and the position of the incision.

Preparation of surgeon and patient should be completed simultaneously and anesthesia begun just soon enough to allow uninterrupted progress of events. Ether, by the open method, I believe to be the anesthesia of choice for a variety of reasons, but chiefly because it allows the maximum of effort with the minimum of manipulation.

In determining the point and character of the incision the differing anatomical features of adult and new-born must be kept in mind. The cervical, thoracic and lumbar segments of the infant vertebral column occupy respectively one-fourth, one-half and one-fourth of its total length, while in the adult, growth has rearranged the limits to one-sixth

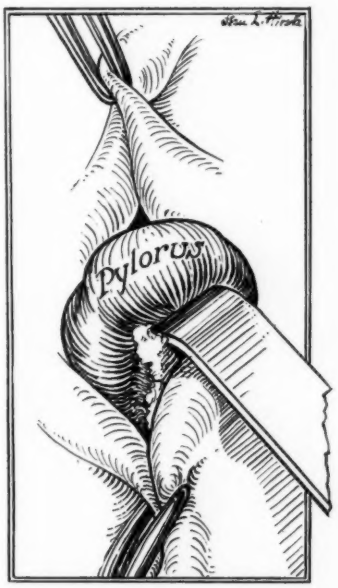
(2) Type of retractor employed to engage and hold the pylorus.

for the cervical one-half for the thoracic and one-third for the lumbar. Thus it will be seen that in the new-born the longitudinal measurement of the abdomen is relatively much shorter than in the adult. As a result the contained viscera lie lower than in later life. The liver of the well-nourished infant occupies about two-fifths of the abdominal cavity and, extending almost below the costal border, completely overlies the stomach.

The vertebral levels of pylorus and cardia are the same as at maturity but the short lumbar segment of infancy brings them lower and nearer the pelvic brim. In view of these structural relationships the most direct route to the pyloric lesion lies through the right rectus muscle just above the liver margin. This site is advantageous not alone for its ready accessibility but also for the action of the liver in preventing escape of intestine while opening and closing the abdomen and acting as a buffer for the closed wound. The poorly developed fascia and relatively thin abdominal musculature together with the slow healing in low nutritional states make the operative wound extremely liable to rupture. To combat this and also to shorten the time expended in closing, the incision should be as small as compatible with easy delivery of the pylorus. This length will usually not exceed 5 cm.

Once through the peritoneum the pylorus may be located with the tip of the exploring forefinger and brought to the surface with a narrow curved retractor which is slipped alongside the finger after the manner suggested by Strauss. If delivery be found difficult because of short mesenteric attachments it may be aided by gentle traction on the falciform ligamentum. As infants do not tolerate evisceration, care should be taken that no intestine escapes or even is seen at the wound opening.

With the pylorus barely delivered and resting in the curve of the retractor, the pyloric tumor is incised longitudinally from stomach to duodenum, the deepest part of the incision being at the midportion and extending only part way to the mucosa. With a flat-bladed instrument the edges are separated and the deeper fibers are ruptured, the exposed mucosa bulging into the opening. Frequently some fibers remain intact and require cutting. This is particularly true near the duodenal end. To avoid accidental perforation I have employed a blunt ended double edged knife which cuts only laterally and which can be used with greater freedom than one with a sharp point. Strauss, in his modification of Rammstedt's technique, frees the

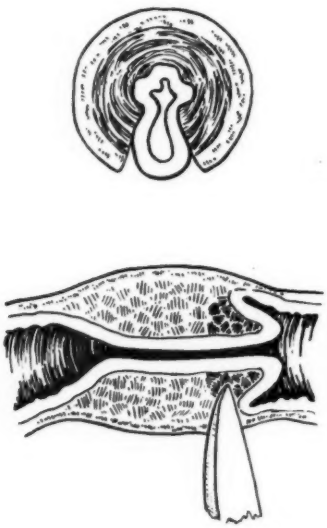


(3) Illustrating the manner in which the pylorus is held in position.

mucosa for nearly two-thirds of its circumference, claiming that the pyloric lumen is made larger at once, rather than gradually, and that for this reason his results are more positive and permanent. This, however, is not generally conceded and most

surgeons employ the original operation, which is certainly much simpler and probably quite as effective. As an incomplete operation is fatal to success in most cases, the incision of the muscle should be carefully inspected for constricting bands and when completed the mucosa should bulge freely into the wound throughout its length. The patency of the pylorus is usually made manifest by the gurgling escape of gas from the stomach into the intestine.

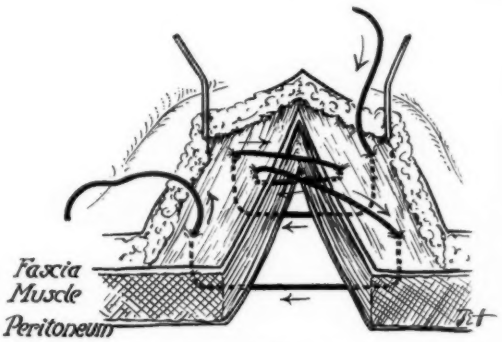
In some few cases there may be marked and annoying hemorrhage particularly in those where the tumor mass is not large or sharply defined. As it is chiefly venous and as no large vessels are to be encountered, hemostasis can usually be effected by a warm moist sponge; if not, a tag of omentum may be stitched to the serosa. Any attempt at placing deep sutures to control bleeding is useless, as the tissue is too friable to retain them.



(4) Diagrammatic section of the hypertrophied pylorus illustrating the manner in which the duodenum may be accidentally opened. Below, bulging of the constricted mucosa after section of the muscle.

A not uncommon operative accident is perforation of the duodenal mucosa. The reason for this is usually an ill-advised attempt at cutting the deep muscular fibers which surround the pyloric orifice. The danger attendant upon this happening lies rather in the corrosive nature of the escaping duodenal fluid than in its bacterial content.

While the operative risk is obviously increased not only by the possibility of leakage but by the added time necessary to repair the damage, this complication is not often a cause of death. Simple approximation of the mucosal wound and application of a covering of omentum is usually successful. In closing the abdominal wound it is well to remember that the infant places a much greater strain upon the line of suture than does the adult and the incidence of ruptured wounds is correspondingly increased. This may be guarded against by using chromic gut throughout and by generous reinforcement with silkworm stay sutures.



(5) Diagrammatic illustration of a method of closing the abdominal wound.

The postoperative care of these cases is comparatively simple but must be exactly and scrupulously ordered.

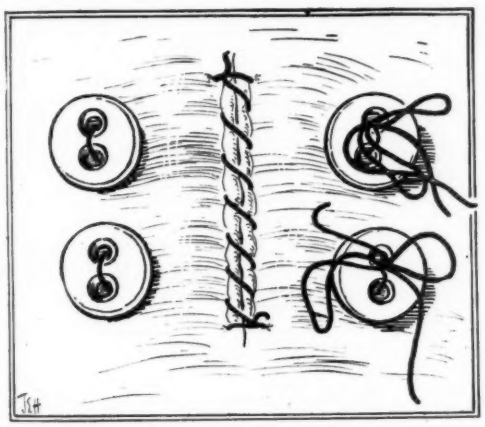
Three definite needs must be observed: food, water and rest. In planning the diet various schemes may be followed. Morgan, Goldbloom and Spence have published the details of management in the cases operated by Downes and other schemes equally good are available. All, however, must subscribe to the general rule that the infant must be returned to his normal diet in the shortest possible space of time. The prolonged practice of abnormally timed and modified dietaries is not only of no possible good but a source of actual damage to the patient.

What is frequently overlooked in infant surgery is disturbance to and loss of the usual periods of rest. This is probably due to the natural hesitancy in administering opiates to the very young. It has recently been demonstrated that babies tolerate opium best in the form of codein and that double and treble the usual doses may be administered with safety.

The end result in those cases surviving operation leaves little to be desired. Veeder, Clopton

and Mills, who made roentgenologic observations of children years after recovery, found gastric motility to be normal, and Reiche reported a series of forty-seven cases above average weight and enjoying excellent health, eight years after operation.

The fate of the tumor has been the subject of numerous investigations, of which Wollstein's are the most complete. In a histological study of the pylorus in twenty-five infants who died at various times following operation, she found that a regular involution of the musculature occurs. Twenty-five days after operation there is only a narrow scar at the site of incision and the pylorus feels only slightly firmer than normal. Sixteen months after operation, only a faint line is seen and at two years the scar is scarcely visible.



(6) Illustration of the method of tying silkworm stay sutures over buttons as employed by Strachauer.

Of the factors affecting mortality all writers are agreed that delay in operating is the greatest cause of death. The most accurate prognostic feature is probably the loss in body weight. Goldbloom and Spence in reporting a series of 163 cases conclude that "in infants weighing less than 3500 gm. the mortality is increased three and one-half times" and that mortality increases in direct proportion to the weight lost previous to operation. The prognosis then must depend upon the time of operation, the preoperative and postoperative care and the skill of the individual surgeon.

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DISCUSSION

DR. FARR: Doctor Zierold has covered this subject very completely. I simply want to accentuate a few points.

There is a paper in the last number of the Surgery, Gynecology and Obstetrics on cardiospasm in which the author calls attention to the fact that we may have obstruction without thickening at the cardiac end of the stomach. We know that we may have the same condition at the pyloric end. He brings forward the theory that some irritation of the sympathetic nerve supply is a factor in the case in which no thickening is found. I feel that where thickening is found, the condition must be congenital. I would disagree with Dr. Zierold only in two points: (1) I believe that local anesthesia is the first choice; (2) I believe the transverse is better than the vertical incision.

I wish especially to stress the necessity for team-work. Our routine is as follows: An arm table is placed at right angles to the operating table and a pillow is placed upon this and then the baby is laid upon a pad of sterile cotton with his feet pointing towards the operating table. The feet are anchored to the operating table and a nurse holds the baby in position by grasping its arms between the shoulders and elbows. Obviously the patient may be con-

trolled in this manner. The skin is sterilized, the patient is draped, and the nurse, surgeon and his assistant are seated during the operation. The operating table is used as an instrument table and is at the surgeon's right. The abdominal wall is infiltrated, using about 20 c.c. of 1 per cent novocain adrenalin solution. The stomach, which has been previously lavaged, is emptied by making pressure upon the abdomen after the passage of a tube. The incision is made well above the liver edge. The pylorus is brought up between the blades of rubber-tipped forceps. The Ramstedt operation is performed, the incision always beginning at the stomach end. As soon as the submucosa presents, it is carefully separated by means of a blunt instrument, after which the thickened muscle may be completely divided. One fine catgut suture is then passed from the upper edge of the cut muscle and the pylorus is allowed to drop back. The suture is then passed through a tag of omentum and tied. In these cases we use a large number of through-and-through silkworm-gut sutures and leave them in place a full two weeks. We have found that if the baby is given a bottle of sweetened water during the operation, this will aid in allaying restlessness.

DR. HAYES: One or two points in the differential diagnosis may be mentioned. Strauss believed that cases in which the symptoms develop before the tenth or fourteenth day after birth are not true pyloric stenoses, but rather cases of phlorospasm. Giving the baby a bottle of sugar water and laying him on his back, one soon notices the peristaltic wave over the epigastrium. Taking this to the point of vomiting gives a very large peristaltic wave resembling a heaving tumor mass.

Dr. Zierold mentioned the necessity of making a small opening. This is especially indicated in the very much emaciated cases. Here it is sometimes almost impossible to close the wound tight enough to prevent leakage. I have seen one case in which the baby could force fluid through the wound just as we finished the closure.

DR. ZIEROLD (closing): With regard to etiology, in reviewing the literature, the first notable thing, of course, is the disease classification. The German literature speaks almost entirely of pylorospasm with different degrees thereof. There are many who believe that there is no hypertrophy at all, but I believe that the work of Sauer has shown very definitely that there is such a thing as true hypertrophy of the muscle. Undoubtedly there are cases of pylorospasm which present the same train of symptoms, clinically at least, as a definite obstruction.

Veeder, Clopton and Mills tried to produce the condition experimentally. They took young animals and injected paraffin at the pyloric ring and were able to produce obstruction with dilatation of the stomach and big peristaltic waves. Evidently the presence of a tumor, even in a minor degree, can cause hyperperistalsis. It is also a fact that a tumor at the pylorus has been known to occur in fetal life.

As to differential diagnosis, when there are visible peristaltic waves and the patient vomits continuously and has starvation stools, this would be considered evidence of an obstruction in any other individual, and why should it not be in these infants?

I have operated on a baby in which I thought there was a true hypertrophy and the baby had been under the care of a very good pediatrician. On opening the abdomen we found no increase in size of the pylorus. The pyloric muscle was divided, and the obstruction was relieved. Strachauer reports a similar experience.

As to the time of operation, this is determined by the condition of the baby, and the amount of starvation and treatment it will tolerate. Stationary weight in an infant corresponds to weight loss in an adult, as the baby's weight should be rapidly increasing at this stage.

The time expended in operation is a tremendous factor in the mortality. I believe most cases will average about fifteen minutes.

Your choice of anesthesia is much like your choice of religion: a matter of training and custom, and subject to about the same amount of discussion.

COMPOSITION OF BISMUTH TARTRATES USED IN THE TREATMENT OF SYPHILIS

The A. M. A. Chemical Laboratory reports that there is considerable confusion concerning the chemical composition of the bismuth tartrates used in the treatment of syphilis. An examination of specimens made by the laboratory, largely to aid the Council on Pharmacy and Chemistry in passing on submitted products, shows that there is a wide variation in the chemical composition of these products, the bismuth alone varying from 31 to about 73 per cent. A specimen prepared by the method said to be used in the preparation of the product used in France as Trepol shows that this is not a potassium sodium bismuth tartrate but is, virtually, a basic bismuth tartrate containing small amounts of potassium and sodium salts as impurities. The Laboratory reports that Trepol, which the manufacturers declare to be complex potassium sodium bismutho-tartrate, does not have the composition claimed and contains needless impurities, and indicated that the manufacturers have not exercised proper chemical control of the preparation. The product manufactured by the Dermatological Research Laboratories, which is claimed to be potassium bismuth tartrate and has been accepted for New and Non-official Remedies, was found to have the composition claimed. A product manufactured by the Powers-Weightman-Rosengarten Co., claimed to be a potassium sodium bismuth tartrate, was found to have the composition claimed.

The report finds out that, in view of the wide range in the bismuth content of this class of preparations, it is necessary that clinicians inquire carefully into the composition of the bismuth products which they use; that some of the bismuth compounds reported on have been used in so-called scientific research without their composition being known to the users, is a reflection on research. *(Jour. A. M. A., Apr. 4, 1925, p. 1067.)*

MINNESOTA MEDICINE

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VOL. VIII JUNE, 1925 No. 6

EDITORIAL

Malpractice

Developments incident to the meeting of the State Medical Association which was held in Minneapolis, April 27-29, 1925, serve to bring most clearly before the profession the important fact that suits for malpractice against Minnesota physicians are assuming an upward curve at what must be considered an alarming rate. There would seem to be no question but that sick people are receiving a higher grade of treatment at present than they have hitherto been offered. Improved diagnostic methods, higher educational standards, greater efficiency in hospital management and many other factors are accountable for this. One might be justified in assuming that under these circumstances the number of suits for malpractice would diminish rather than increase. While it is prophesied that the change made in the statute of limitations will have a tendency to inhibit the instigation of malpractice suits, and while we sincerely trust that this will be the case, this has no direct bearing upon the question of the cause for the "epidemic" of onslaughts upon the medical profession in the recent past. It would seem that there must be some special forces at work, the nature of which we have been unable to discern.

A discussion as to all the probable causes for this rapid increase would perhaps lead us too far afield, but an analysis of the factors which might enter into the instigation of legal proceedings against a physician for alleged malpractice leads one to analytically consider the following: the physician who is being sued; the scientific standard of the treatment administered; some member or members of the legal profession; the patient or his sponsor; and two other elements, namely, the success achieved by former plaintiffs in obtaining verdicts in court or settlements without trial and the influence of members of our own profession in initiating and abetting suits of this nature.

As stated, while it is beyond the scope of this editorial to consider all of these and other agencies which may underlie the bringing of a suit for malpractice, and while it is improbable that we as a profession could greatly influence or mitigate any of them, there are, at least, two over which the medical profession may exert almost complete control. We refer especially to the settlement by compromise in instances where there is great probability that the case could be successfully defended but where the physician desires to avoid the annoyance and unsavory notoriety connected with court proceedings. (The fact that the physician who is protected by adequate insurance may make this compromise without financial sacrifice is, perhaps, too often a factor in the making of this concession.) In instances of this kind even though the amount involved may be small, the knowledge gained by the plaintiff's friends that settlement has been made is undoubtedly a great factor in encouraging the instigation of malpractice suits among those who may become cognizant of the procedure and who are willing to participate in this variety of blackmail. Secondly, we feel quite certain that the conviction so thoroughly stressed during our recent discussion of this subject at the state meeting, that almost every malpractice suit has, as its origin, the action of some member of our own profession, is based upon fact. If both of these latter premises are true, and that they are there seems to be no doubt, the medical profession must realize that great improvement is not to be anticipated un-

less a certain amount of "house-cleaning" within its own ranks is accomplished.

There is, of course, no comparison between the class of physicians who contribute indirectly to the number of malpractice suits through the use of compromising methods and those who deliberately by word or act become the initiative agent. Among the former a certain amount of missionary, educational and suggestive therapy is to be recommended. With those who deliberately lend themselves to the reprehensible action of initiating malpractice suits against their brother physicians, nothing but the most drastic measures will prevail, and it is to those that we will refer especially.

While all true physicians will deprecate the protection of any physician who has been palpably negligent in the treatment of a case, and while we realize that it is to our best interests to avoid the furnishing of such protection, an investigation of the individual merits of *all* malpractice suits will show that but *few* are successfully prosecuted and perhaps still fewer will show, upon careful analysis, that the defendant has failed to offer to the plaintiff a reasonable standard of service, the plaintiff's co-operation and other factors being taken into account.

That we have in our profession a few individuals who are willing, for financial or other considerations, to debase themselves, as well as their profession, is undoubtedly true. In what manner shall they be dealt with? Is not the medical profession becoming imbued with the spirit of laxity with which our country seems permeated during recent years? Are we not failing to make the punishment fit the crime? Each county society is endowed with the proper equipment, in so far as rules are concerned, with which to deal with this class, and yet is it not a fact that our county societies, acting through their boards of censors, are too often afflicted with a spirit of sympathy or that the respective county societies are composed of men who are not of a sufficiently high morale to mete out the deserved justice? We might cite an instance where a physician admitted to the board of censors of his county society that he had deliberately testified to a falsehood in an effort to wrongfully aid a plaintiff in a malpractice suit. After much discussion and deliberation the board of censors summoned up enough courage to recommend "suspension" of this individual from his county society. With the aid of his personal friends and a few "left-handed" members of the county society he all but escaped this totally inadequate punishment. After being suspended for one year he is once more a member in good standing in his society and unless some unusually favorable set of circumstances allow the meting out to him of his just deserts, he will remain so. The only argument to be heard in his favor was that it had been the first time he had been "caught."

It is our feeling that until such time as the individual morale is sufficiently highly developed within the medical profession itself these "snakes in the grass" will continue to ply their trade and malpractice suits will be threatened without regard to the individual merits of the cases involved. If the cause of the bringing of malpractice suits is due largely to the action of individuals in good standing in our county medical societies is it not our duty to ferret out and to expel such members whenever possible?

The State Meeting

The recent meeting of the State Association held in Minneapolis was the largest in point of attendance in our history. There were 704 registrations, 323 of which were from without the Twin Cities, 269 from Minneapolis and 112 from St. Paul. This from a total membership of 1,922. The nearest approach to this meeting in the way of attendance was at the 1920 meeting in St. Paul when 626 registered.

The meetings held in the Twin Cities are always the best attended. For this reason the suggestion has been offered in various quarters that all our meetings be held near the center of population, preferably at the University. The proposition, however, was not even considered by the House of Delegates and the variety lent by meeting at times in Rochester and Duluth lends spice to the life of the Association.

The participation by Dr. Haggard, the president of our national organization, who in addition to his official capacity is most attractive personally, and the presence of Dr. Billings and Dr. Woodward, who are both so intimately associated with the official life of the American Medical Association, attracted many of our members.

President Burnap is to be particularly congratulated on the success of the meeting. Only those who came in contact with him officially know the

energy he expended in choosing his committees and in lending his presence to committee meetings. The scientific program was among the best and the experiment of holding general clinical sessions was a success. The large attendance at the Monday evening meeting devoted to the discussion of medical economics showed the general interest in the subject. A similar meeting might well be held next year.

The joint meeting with the annual Minneapolis Clinic Week doubtless added to the popularity of the week's program as there was thus provided additional clinics for those who wished to remain over for them.

The outstanding feature of the meeting of the House of Delegates was the report of the success of the Committee on Legislation. For the first time in history legislation proposed by our Association was successfully engineered through the state legislature. This was largely due to the energy and sagacity of the chairman of the legislative committee, Dr. H. M. Johnson of Dawson. Never before has a member of our Association devoted so much time or sacrificed as much personally for the good of our State Association and the physicians and dentists of the state as has Dr. Johnson. The assurance that Dr. Johnson is willing to continue his services in legislative activities is almost too good to be true.

The study of medical defense made by the committee under Dr. E. S. Judd was most elaborate. The Council was authorized to make a contract with an insurance company for medical defense insurance on a group basis at the option of each individual member. Those who do not choose to take advantage of the group rate will have to defend themselves. Although not legally required to do so, the House of Delegates voted to defend members who may be the victims of malpractice suits for services rendered in the two-year period previous to June 27, 1925, at which date the new two-year statute of limitations goes into effect.

The officers elected for the year 1926 were:

President—Dr. Herman M. Johnson, Dawson.

First Vice-President—Dr. W. F. Braasch, Rochester.

Second Vice-President—Dr. Arthur N. Collins, Duluth.

Third Vice-President—Dr. E. G. McKeown, Pipestone.

Secretary—Dr. E. A. Meyerding, St. Paul.

Treasurer—Dr. Earle R. Hare, Minneapolis.

Councillors—Dr. J. G. Millspaugh, Little Falls; Dr. F. J. Savage, St. Paul; Dr. H. M. Workman, Tracy.

Dr. J. C. Litzenberg of Minneapolis was re-elected delegate to the American Medical Association. The wisdom of re-electing delegates not only to the American Medical Association but to the State House of Delegates cannot be overemphasized. It takes several years to become acquainted not only with the other delegates but with the duties of a delegate. President Burnap was elected alternate delegate to Dr. Litzenberg.

The annual meeting of the Association in 1926 will be held in St. Paul. The date of the meeting lies at the discretion of the Council. There are good reasons for continuing to hold our meetings in the spring. Although the spring is the season for many of the national meetings, summer vacations do interfere somewhat with early fall medical meetings.

Accident Cases

Of the outstanding examples of extravagance that burden the taxpayer in large cities today, one of the most prominent is the handling of accident cases. Regardless of the fact that almost all accidents are covered by insurance, the average municipal hospital, in its zeal to function, is caring for accident cases from occurrence to convalescence.

An efficient emergency hospital centrally located, connected with the police department, could by means of its ambulances, reach the injured, render first aid and place the patient in his home or in a private hospital under the care of his own, his employer's or the hospital staff's surgeon. The useless and often harmful handling of the injured could be prevented by immediately placing him where he belongs rather than knowingly misplacing him in the beginning. The old well established relation between patient and doctor, employer and employee, private hospital and patient, insurance company and insured, is jeopardized by allowing the municipality to continue in this particular type of business to the extent they are doing.

The insurance premiums paid by the employers and motorists are ample to take care of the entire expense of the accident, and it is therefore unjust and unbusinesslike to make the taxpayer pay for care for which funds have already been provided.

Consideration of the above problem might result in better care for the injured, private hospitals and the surgeons receiving promptly patients that are rightfully theirs, the insurance companies discharging their own obligations, and most important of all, lessening the municipality's activity in business.

The malfunction of many municipal hospitals is to blame for their overcrowding. Take away from them the emergency accident work that can pay its own way and the most of these institutions will be found large enough to take care of their indigent for many years to come.

C. C. K.

MISCELLANEOUS

An offer of a site for the construction of a new Minneapolis General Hospital has been made to the City of Minneapolis by the University. In order to inform the profession of the details of the proposal, copies of the original communications are being published.

PETITION TO ROCKEFELLER FOUNDATION AND GENERAL EDUCATION BOARD

The Board of Regents of the University of Minnesota petitions the Trustees of the Rockefeller Foundation and the Trustees of the General Education Board of New York City for a grant of $2,000,000 to be used in completing the hospitals and teaching laboratories of the Medical School of the University of Minnesota, in erecting a dental building as a part of the medical plant, and in purchasing land adjacent to the Medical School for the erection of the Minneapolis City Hospital thereon.

The Board of Regents of the University of Minnesota agrees to undertake to match the grant with an equal sum by private gifts or by state appropriations, or both, to be used for the purposes stated above.

The Board of Regents requests that it may have, if possible, until July 1, 1929, to provide its share of the total sum. While the Board of Regents confidently hopes and expects to raise its share of the total sum before July 1, 1925, it wishes to point out that a peculiarly distressing economic situation exists in the Northwest at the present time and that this situation may still prevail at the time of the next session of the Legislature in 1925.

The Board of Regents requests the Rockefeller Foundation and the General Education Board to allot their gifts, if possible, in sums of $200,000, when matched by a corresponding sum by the University, until enough money has been provided in this way by the Rockefeller Foundation and the General Education Board to enable the University to purchase the land necessary for the location of the Minneapolis General Hospital thereon. It is expected that the purchase of the land will require $1,000,000 or less. If this plan is agreed to it may enable the University to proceed more rapidly than it could otherwise with the purchase of the land, and this is desirable, as the land is increasing in value every year.

The Board of Public Welfare of the City of Minneapolis joins with the Board of Regents in petitioning the Rockefeller Foundation and the General Education Board for the gift insofar as it provides land for the erection of the new City Hospital, and it files herewith a resolution as evidence of its good faith and intention that it will proceed as rapidly as possible with the erection of the new hospital on the land thus purchased, the first unit of which will house 1,000 beds. It is also understood and agreed to by the Board of Public Welfare and the University of Minnesota that the newly erected City Hospital shall be used for teaching, research and educational purposes.

January 31, 1925.

RESOLUTION OF BOARD OF PUBLIC WELFARE OF CITY OF MINNEAPOLIS

March 4, 1924.

HONORABLE BOARD OF REGENTS,
UNIVERSITY OF MINNESOTA,
Albert J. Lobb, Esq., Secretary.
My Dear Sir:

THE BOARD OF PUBLIC WELFARE of the City of Minneapolis at its meeting held this 4th day of March, 1924, unanimously adopted the following resolution:

"BE IT RESOLVED: That the Board of Public Welfare of the City of Minneapolis unite with the University of Minnesota in requesting the Rockefeller Foundation to provide additional land upon which further hospital facilities can be erected for the use of the citizens of the City of Minneapolis."

Respectfully submitted,

(Signed) RICHARD TATTERSFIELD,
Secretary.

November 25, 1924.

Dear President Coffman:

At a meeting of the General Education Board, held November 20, 1924, the officers presented your communication dated March 22, 1924, requesting the co-operation of the Board in raising approximately $4,000,000 in new money for carrying out certain extensive improvements in your Department of Medicine and Dentistry. Inasmuch as the General Education Board does not make contributions in the field of dentistry, the total amount under consideration was, according to your estimates, reduced to $3,600,000. Towards this sum the General Education Board authorized its Executive Committee in its discretion to appropriate $1,250,000, it being understood that the Committee would take such action if informed by you that the contribution in question would enable you to carry through your entire program. I shall be happy to bring the matter before the Executive Committee whenever we have had word from you to that effect.

With all good wishes, I am,

Very sincerely yours

ABRAHAM FLEXNER.

THE UNIVERSITY OF MINNESOTA, MINNEAPOLIS

April 28, 1925.

Dean E. P. Lyon,
Medical School,
University of Minnesota.

My Dear Dean Lyon:

You are privileged to state that it is the understanding of the University that in offering land to the city for the location of the Minneapolis General Hospial, no time limit is specified in which the city is expected to erect its hospital on said land. All that is desired is that the city shall signify through its proper official bodies its intention to accept the gift of the land and to locate the Minneapolis General Hospital thereon.

You are also privileged to state that the University is not concerned as to whether the entire General Hospital is erected at one time or whether the hospital should be erected a pavilion at a time as the needs of the city demand, the present General Hospital being used in the meantime and only gradually abandoned as the new hospital is developed.

It is understood that in accepting the gift the city would plan to build thereon eventually a hospital ample for the city's needs, but as to the time and manner of building, whether it is done all at once or in parts, the University is not concerned.

Cordially yours,

L. D. COFFMAN,
President.

OBITUARY

DR. EDWARD WALTHER

Dr. Edward Walther, 89 years old, widely known St. Paul physician, died Sunday, April 17, at his home, 433 Dayton avenue, after an illness of three months.

Dr. Walther had been a resident of St. Paul 57 years, having come there in 1868 from Germany, where he was born in 1836.

His father was Frederick Walther, a general in the German army, and his family was one of the oldest in Weimar-Saxony. The doctor's elementary education was obtained from tutors and his knowledge of medicine at the University of Leipzig.

His first visit to the United States was in 1853 with an uncle, but he returned to Germany to continue his education.

Surviving Dr. Walther are his widow, Mrs. Katherine Walther; a son, Edward, of Warren, Idaho, and five daughters, Miss Sophie Walther, St. Paul, Mrs. F. W. Southworth and Mrs. S. A. Perkins of Tacoma, Wash.; Mrs. F. T. Crowe, Seattle, and Mrs. Harry Hemminghouse, Portland, Ore.

DR. W. M. THEISSEN

Dr. W. M. Theissen, prominent Faribault physician and a leading figure in Faribault community affairs, passed away at his home, Friday, May 15, 1925. Death was caused by angina pectoris and followed a very brief illness.

At the time of his death Dr. Theissen was still in the prime of life, lacking a few days of being forty-nine years of age. He was born at Henderson, Minnesota, May 30, 1876, spending his boyhood there. He graduated from the Henderson high school and later attended the Hamline College of Physicians and Surgeons and the University of Minnesota, receiving the degree of M.D. in 1901.

Since his graduation he has practiced medicine at Jeffers, Minnesota, Henderson and Minneapolis, coming to Faribault in the fall of 1913.

On May 20, 1903, he was united in marriage to Miss Anna Littel of Minneapolis, who survives her husband. Dr. Theissen is also survived by three children, Victor, now a student at Notre Dame University, Lionel and Rose. He is also survived by two sisters and three brothers, J. A. Theissen, John N. Theissen, Henry Theissen and Miss Helen Theissen, all of St. Paul, and Mrs. F. W. Bertrang of Henderson.

Dr. Theissen, during the time that he lived in Faribault, was an untiring civic worker. As chairman of the streets and highways committee of the Chamber of Commerce, he took an active part in good roads work in Rice County. He was also an active member of the local council of the Knights of Columbus and was a past grand knight of the organization.

Dr. Theissen served four years as a member of the board of education of the Faribault schools, retiring from the board at the last election. He was also a member of the Catholic Order of Foresters, the Modern Woodmen of America, and of the Rice County, Minnesota and American Medical Associations.

DR. GEORGE L. S. SCHULZE

Dr. George Schulze died at his home in Minneapolis, Wednesday, May 6, 1925, following a long illness, at the age of sixty-three.

Dr. Schulze was a native of Germany and came to Elysian, Minnesota, from Vilsen, Hanover, in the early nineties. He practiced medicine there for several years, later moving to Owatonna, then to Minneapolis, where he had been in active practice for a period of sixteen years.

Dr. Schulze is survived by his widow and one son, George. Two daughters died several years ago.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

CHISAGO-PINE COUNTY MEDICAL SOCIETY

Members of the Chisago-Pine County Medical Society held their annual meeting May 12, 1925, at Pokegama, as guests of Pokegama Sanatorium. Dr. Callahan, the superintendent, conducted the members on a tour of inspection of the new building. The Sanatorium has grown away from the cottage method of treatment of tuberculosis. The rooms have very large windows with three sashes, making it possible to obtain two-thirds of the full opening. The ventilation is as nearly like outdoors as it is possible to have it. Cases of skin tuberculosis, artificial pneumothorax, and massive resection of ribs were shown.

At the business meeting the secretary reported that there were six additions to the society since his last report, namely, Dr. Freymiller, Dr. Holmes, Dr. Stewart, Dr. Stephan, Dr. Stratte and Dr. Callahan. One member, Dr. Gray, left the Society, going to the Pacific Coast. All the doctors in Chisago and Pine Counties are now members with one exception.

The same officers were re-elected: Dr. H. P. Dredge, President; Dr. Theo. Paulson, Vice President; Dr. C. G. Kelsey, Secretary. Dr. Dredge was elected delegate to the State Society meeting.

After the business session a banquet was served in the main dining-room, where the following papers were read:

1. The Treatment of Gonorrhea in Women.
   Dr. R. T. La Vake, Minneapolis.
2. General Treatment of Diabetes and the Use of Insulin.
   Dr. A. H. Beard, Minneapolis.
3. Infant Feeding.
   Dr. Ray Shannon, St. Paul.
4. Appendiceal Peritonitis.
   Dr. Warner Ogden, St. Paul.

The Society gave a rising vote of thanks to Pokegama Sanatorium, and especially to Dr. Callahan, for the sumptuous entertainment and the splendid program.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

Dr. F. R. Huxley of Faribault was elected president of the Southern Minnesota Medical Association at the annual meeting held in Owatonna, May 18, 1925.

Other officers elected are: Dr. J. S. Holbrook, Mankato, first vice president; Dr. A. H. Logan, Rochester, second vice president; Dr. H. T. McGuigan, Red Wing, secretary-treasurer.

SOCIETY FOR BIOLOGICAL AND MEDICAL EXPERIMENTAL WORK

Papers and speeches concerning different phases of research work were given at a meeting of the Society for Biological and Medical Experimental Work, Wednesday, May 6. Officers for the coming year elected as follows:

Dr. F. H. Scott, re-elected chairman of the Society; councilors, George Fahr, medicine representative; R. A. Gortner, agricultural representative; J. A. Harris, science, literature and arts; and E. C. Kendall, from Rochester, Minnesota.

Immunization of children and adults against toxin of scarlet fever by heating toxin with solutions of castor oil soap was discussed by Dr. W. P. Larson and Dr. Woodward Colby.

Simple methods for determining non-protein nitrogen in blood was presented by Dr. P. Hench and Martha Aldrich. A paper concerning the isolation of a new hormone from the parathyroid gland, by which it will be possible to control convulsions and also cause an increase in the calcium salts in the blood, was read by Dr. Adolph Hanson.

LYMANHURST STAFF MEETING

The regular meeting of the Lymanhurst staff will be held at the Lymanhurst School, 1800 Chicago Avenue, Minneapolis, Saturday, June 20, 1925.

The following program has been arranged:

Subject to be announced later. Dr. Allen K. Krause, Managing Editor of the American Review of Tuberculosis, and Director of Tuberculosis, Johns Hopkins Hospital, Baltimore, Maryland.

Subject to be announced later. Dr. Philip P. Jacobs, Managing Editor of the Journal of the Outdoor Life, and Publicity Director of the National Tuberculosis Association, New York City.

Subject to be announced later. Dr. Linsly R. Williams, Managing Director National Tuberculosis Association, New York City.

STEARNS-BENTON COUNTY MEDICAL SOCIETY

At the annual meeting of the Stearns-Benton County Medical Society held on April 9, 1925, at the U. S. Veterans Hospital, the following officers were elected: President, Dr. Wm. Friesleben, Sauk Rapids; vice-president, Dr. A. A. Meyer, Melrose; secretary and treasurer, Dr. J. N. Libert, St. Cloud.

The following program was given by the members of the U. S. Veterans Hospital staff: Dr. R. D. Blackmore, *Manic-depressive Psychosis, Depressed.* Dr. L. A. Mangan, *Manic-depressive Psychosis, Manic.* Dr. R. E. Davis, *Constitutional Psychopathy.* Dr. G. D. Rice, *Encephalitis Lethargica Residual.*

Following the meeting the Doctors of the Staff gave a dinner for the members and a tour of inspection was made of the hospital.

THE MINNESOTA NEUROLOGICAL SOCIETY

The Minnesota Neurological Society holds its last meeting of the year at the Mayo Clinic, Rochester, on Saturday, June 13th. The forenoon will be devoted to Neurological Surgery, and clinical presentations. The afternoon will be devoted to papers and discussions by the members of the Mayo Clinic staff.

Officers of the Society for the year are: President, Dr. J. C. Michael, Minneapolis; Vice-President, Dr. Arthur Sweeney, St. Paul; Secretary, Dr. E. J. Engberg, St. Paul.

OF GENERAL INTEREST

Dr. F. W. Gaarde and Dr. R. M. Wilder attended the meeting of the Billings Club in Chicago the early part of April.

Dr. A. U. Desjardins read a paper at the meeting of the Wisconsin State Medical Association on Thursday, April 30.

Dr. W. D. Haggard, President-elect of the American Medical Association, was the guest of Dr. W. J. Mayo from April 29 to May 3.

Drs. E. S. Judd, D. C. Balfour and J. C. Masson attended the meeting of the Interurban Surgical Society in New York City on May 7 and 8.

Dr. John M. Culligan has announced the opening of offices at 718 Lowry Bldg., St. Paul, for the practice of urologic and general surgery.

Dr. B. B. Vincent Lyon was in Rochester on March 9 to give a Mayo Foundation lecture in which he discussed his method of non-surgical drainage of the gallbladder.

Dr. G. Allen Robinson of the radium department of the New York Postgraduate Hospital gave a Mayo Foundation lecture in Rochester on April 9. His subject was "Radium in Dermatology."

Dr. H. S. Plummer delivered the annual Alpha Omega Alpha address of the Minnesota chapter on Thursday, May 30. His subject was "The Function of the Thyroid in Exophthalmic Goiter."

Dr. R. D. Carman attended the meeting of the Texas State Medical Association in Austin during the first week in May. He read papers before this Association and before the Texas Radiological Society.

Drs. L. G. Rowntree, H. S. Plummer, W. S. Lemon, R. M. Wilder, W. M. Boothby, H. Z. Giffin and Norman M. Keith attended the meeting of the Interurban Clinical Club, which was held in Minneapolis on April 18.

"Clinical and physiologic study of colonic function" was the subject of the president's address delivered by Dr. E. L. Gardner, Minneapolis, before the annual meeting of the Minnesota Pathological Society, Tuesday, May 19, 1925.

Dr. Henning F. Wiese, graduate of Christiania University, Oslo, Norway, formerly a fellow at the Mayo Clinic and later associated with the Middlefurt Clinic at Eau Claire, Wisconsin, is now Associate Surgeon at the Sivertsen Clinic, Minneapolis.

Dr. Herbert Evans, Professor of Anatomy, University of California, came to Rochester April 3 to speak on "The Relation of Nutrition to Reproduction." This was the last of a series of lectures on nutrition arranged by the Mayo Foundation and the Mayo Foundation chapter of Sigma Xi.

Psychopathic work which has been carried on in the state by a group of men traveling about from one territory to another will be discontinued after July 1, as a bill for the continuation of the service was dropped by the Minnesota legislature.

Until the Rockefeller comprehensive plan goes through there will be no work among the mentally diseased of the state, according to members of the Medical school faculty of the University of Minnesota.

The date of the annual meeting of the Interstate Postgraduate Assembly of America under the direction of the Tri-State Medical Association to be held in St. Paul this fall has been changed to October 12 to 16 inclusive so as to avoid conflict with the annual meeting of the American College of Surgeons.

At the regular meeting of the Park Region Medical Society, held April 8, the following resolution was adopted:

Resolved—That any member who enters into contract with insurance companies to render professional services, either surgical or medical, at a reduced fee, shall be automatically excluded from membership in this society.

Dr. J. C. Litzenberg and Mrs. Litzenberg, of Minneapolis, are motoring in the east.

Dr. Litzenberg attended a meeting of the Gynecological society in Washington and of the American Medical association in Atlantic City, which were held in May. Dr. and Mrs. Litzenberg will visit their daughter, Avis, at Goucher college before returning home.

Dr. W. J. Mayo went to Washington to preside at the meeting of the Congress of American Physicians and Surgeons which was in session there on May 4, 5 and 6. The subject of his presidential address was "Contributions of Pure Science to Progressive Medicine." He also read a paper before the American Surgical Association on "The Relation of the Spleen to Certain Chronic Purpuras."

The files of the Transactions of the Minnesota State Medical Association have recently been checked and it has been noted that the numbers for the following years are missing: 1876, 1887, 1895. The State Association would appreciate receiving copies as gifts for their files or the loan of copies for the purpose of making reprints. It is requested that any member having copies of the missing numbers communicate with the office of MINNESOTA MEDICINE, 402 Guardian Life Bldg., St. Paul, Minn.

Ten medical students of the University of Minnesota have been elected this year to Alpha Omega Alpha, honorary medical fraternity, election to which is based on scholarship.

New members who were graduated from the medical school in December include Walter H. Ude, Frank J. Heck, Oslak M. Boe, Abel Ellingson, S. H. Sturmans, Allan F. Giesen, and Alano Pierce. The three members of the June class who were elected were Ruth E. Vories, Lawrence Carlson and Shattuck W. Hartwell.

Completion of the Todd Memorial and Cancer Institute on the Medical campus is scheduled for June 1. The building will not be occupied by the medical department until some time in July.

Constructed at a cost of about $200,000, the institute is an addition and almost an exact duplicate of the present General hospital. The wing will contain 200 rooms with a lavatory provided for each of the 100 bedrooms. The *x*-ray room is to be tiled and the ceiling and walls are to be lined with lead.

A short course in tuberculosis, June 22 to 27, 1925, is offered the physicians of the state by the University of Minnesota in co-operation with the Hennepin County Tuberculosis Association and the Glen Lake Sanatorium. Dr. Allen K. Krause of Johns Hopkins and Dr. Gerald B. Webb

of Colorado will be the guest teachers for the course, which will also be conducted by twenty other clinicians and lecturers. All types of tuberculosis will be studied. The fee for the course is $15 and registration should be made at the General Extension Division office, Room 5, Main Engineering Building, University Campus, Minneapolis.

Minnesota has been placed in a position to make a wholly new contribution to knowledge of the child of pre-school age as a result of a gift of $245,000 for the establishment of an Institute of Child Welfare, announced by Dean F. J. Kelly. The gift will become available at the rate of $49,000 a year for five years. It comes from the Laura Spelman Rockefeller Memorial, one of the educational funds established by the Rockefeller family.

The development of habits in children, the study of means for bettering child health, giving children the best instruction and the most normal reactions to their surroundings will be problems considered by institute workers. An infants' home, in which a small number of children ranging in age from two weeks up, and a nursery school, to which children up to the age of five years may be sent, will be established in connection with the Institute of Child Welfare.

In 1924 the State Medical Association approved the idea of a joint extension course for medical practitioners in conjunction with the University and appropriated the sum of $100 for expenses.

Plans were laid under the direction of Dr. N. O. Pearce of Minneapolis, chairman of the State Committee on Hospitals and Medical Education whereby groups of physicians in the state may take advantage of a thirteen days' program to be given by two clinicians one day each week over a period of thirteen weeks. The groups pay the traveling and living expenses of the clinicians who devote their services and a slight overhead charge for administration work of the Extension Division of the University.

The tentative program includes the names of well known clinicians in the Association and the subjects are appropriate for postgraduate work.

Communications should be addressed to the General Extension Division, University of Minnesota, Minneapolis.

Maurice Visscher, an instructor in the department of physiology of the Medical school, University of Minnesota, was awarded the National Research fellowship in physiology, it has been announced by E. P. Lyon, dean of the Medical school.

Mr. Visscher will work under Prof. A. V. Hill, of the University college of London, England, for the year 1925-26. The fellowship, which is worth about $3,000, is given by the National Research council.

Mr. Visscher will be a fellow in the department of medical sciences and his field will be physiology. He will continue the work he has been doing here on the physiology of carbohydrate utilization in the body. One of the problems involves a study of carbohydrate metabolism of muscles, a subject upon which Dr. Hill has done much work.

Mr. Visscher qualified for his B.A. degree at Hope college, Holland, Michigan, and took his medical work at the University of Minnesota, where he is a fellow in the department of physiology.

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

COOK LABORATORIES:
- Streptococcus Vaccine X plain
- Acne Vaccine (Cook) Combination X
- Typhoid Vaccine X Plain
- Typhoid Vaccine XX Combined
- Whooping Cough Vaccine (Cook) X Plain
- Staphylococcus Vaccine Combined

CUTTER LABORATORIES:
- Rabies Vaccine (Semple)-Cutter

EASTMAN KODAK COMPANY:
- Resorcinol Monoacetate

HILLE LABORATORIES:
- Lunosol
  - Lunosol Capsules, 6 grains

HYNSON, WESTCOTT & DUNNING:
- Brom-sulphalein-H.W.D.
  - Solution Brom-sulphalein-H.W.D.

ELI LILLY & CO.:
- Scarlet Fever Streptococcus Antitoxin (Unconcentrated)
- Scarlet Fever Streptococcus Antitoxin (Concentrated)

H. K. MULFORD CO.:
- Pollen extracts of Ash Tree, Bermuda Grass, Box Elder, Canary Grass, Cocklebur, Corn, Cottonwood Tree, Daisy, Dandelion, Dock, False Ragweed, Goldenrod, Johnson Grass, June Grass, Lamb's Quarters, Maple, Marsh Elder, Mountain Cedar, Mugwort, Oak Tree, Orchard Grass, Perennial Rye Grass, Plantain, Redroot Pigweed, Redtop, Russian Thistle, Rye, Sagebrush, Sugar Beet, Sunflower, Sweet Vernal Grass, Walnut Tree, Western Ragweed, Wormwood.

SHARP & DOHME:
- Caprokol (Hexylresorcinol-S. and D.)

FREDERICK STEARNS & CO.:
- Insulin-Stearns Single Strength
- Insulin-Stearns Double Strength
- Insulin-Stearns Quadruple Strength

E. R. SQUIBB & SONS:
- Lentil-Allergen-Squibb

UNITED STATES STANDARD PRODUCTS CO.:
- Scarlet Fever Streptococcus Antitoxin-U.S.S.P.

NEW AND NON-OFFICIAL REMEDIES

Butesin Picrate Dusting Powder.—It is composed of butesin picrate (Jour. A. M. A., March 15, 1924, p. 876) 5 per cent and sodium stearate 95 per cent. Abbott Laboratories, Chicago.

Iron Citrate Green-P. D. and Co.—A complex ferric ammonium citrate, containing ferric citrate equivalent to 16 per cent of iron and ammonium citrate equivalent to 8.1 per cent of ammonia. For a discussion of the actions and uses of iron preparations, see New and Non-official Rem-

edies, 1924, p. 165. Iron citrate green-P. D. and Co. is intended for intramuscular and hypodermic administration. Iron citrate green-P. D. and Co. is supplied in the form of ampules containing respectively ¼ grain, ¾ grain and 1½ grain of the iron citrate green-P. D. and Co. Parke, Davis and Co., Detroit. (Jour. A. M. A., Apr. 4, 1925, p. 1045.)

Timothy Pollen Extract-Swan-Myers.—A liquid obtained by extracting the dried pollen of timothy with a liquid consisting of 67 per cent glycerin and 33 per cent saturated solution of sodium chloride. For the actions and uses of allergic protein preparations, see New and Non-official Remedies, 1924, p. 244. The preparation is marketed in the following forms: Series I, five vials containing doses Nos. 1 to 5, inclusive. Series II, five vials containing doses Nos. 6 to 10, inclusive. Series III, five vials containing doses Nos. 11 to 15, inclusive. Complete series, packages containing the fifteen consecutive doses. Swan-Myers Co., Indianapolis.

Allergens-Squibb.—In addition to the allergens-Squibb previously accepted (New and Non-official Remedies, 1924, p. 247), the following have been accepted: Bacillus Acne Allergen-Squibb; Bacillus Friedlander Allergen-Squibb; Bean (Kidney) Allergen-Squibb; Cauliflower Allergen-Squibb; Daisy Pollen Allergen-Squibb; Frog Legs Allergen-Squibb; Lentil Allergen-Squibb. E. R. Squibb and Sons, New York.

Group Allergens Diagnostic-Squibb.—In addition to the group allergens diagnostic-Squibb previously accepted (New and Non-official Remedies, 1924, p. 258), the following have been accepted: Group Allergens-Squibb Type V (Kidney Bean, Lentil, Lima Bean, Navy Bean, Pea); Group Allergens-Squibb Type XIII (Frog Legs, Lamb, Rabbit, Sweetbread, Veal); Group Allergens-Squibb Type XXIV (Corn, Golden Rod, Ragweed, Rye); Group Allergens-Squibb Type XXV (Bacillus Acne, Bacillus Coli, Bacillus Diphtheroid, Bacillus Influenzæ, Bacillus Pertussis, Bacillus Typhosus, Gonococcus). E. R. Squibb and Sons, New York.

Parathyroid Gland Desiccated-P. D. and Co.—The exterior parathyroids of the ox freed from fat, desiccated and powdered. For a discussion of the actions and uses of desiccated parathyroid gland, see New and Non-official Remedies, 1924, p. 224. The product is supplied in the form of tablets containing 1-10 grain. Parke, Davis and Co., Detroit.

Iletin (Insulin-Lilly) U-80, 10 c.c.—Each c.c. contains 80 units of Iletin (Insulin-Lilly) (New and Non-official Remedies, 1924, p. 152). Eli Lilly and Co., Indianapolis. (Jour. A. M. A., Apr. 11, 1925, p. 1119.)

Protein Extracts Diagnostic-P. D. and Co.—In addition to those protein extracts diagnostic-P. D. and Co. previously accepted (New and Non-official Remedies, 1924, p. 255) the following have been accepted: Apricot Protein Extract Diagnostic-P. D. and Co.; Cauliflower Protein Extract Diagnostic-P. D. and Co.; Daisy (Ox-Eye) Pollen Protein Extract Diagnostic-P. D. and Co.; Daisy (Yellow) Pollen Protein Extract Diagnostic-P. D. and Co.; Friedlander Bacillus Protein Diagnostic-P. D. and Co.; Lentil Protein Extract Diagnostic-P. D. and Co.; Micrococcus Tetragenus Protein Extract Diagnostic-P. D. and Co.; Oak Pollen Protein Extract Diagnostic-P. D. and Co.; Paratyphoid Bacillus A Protein Extract Diagnostic-P. D. and Co.; Paratyphoid Bacillus B Protein Extract Diagnostic-P. D. and Co.; Pine Pollen Protein Extract Diagnostic-P. D. and Co.; Streptococcus (Hemolytic) Protein Extract Diagnostic-P. D. and Co.; Streptococcus (Non-Hemolytic) Protein Extract Diagnostic-P. D. and Co. Parke, Davis and Co., Detroit.

Group Protein Extracts Diagnostic-P. D. and Co.—In addition to the group protein extracts diagnostic-P. D. and Co. (New and Non-official Remedies, 1924, p. 259), the following have been accepted: Protein Extracts Diagnostic-P. D. and Co. Group 8 (Bean (Lima), Bean (Navy), Bean (String), Pea, Lentil); Protein Extracts Diagnostic-P. D. and Co. Group 10 (Cabbage, Cauliflower, Lettuce, Parsnip, Spinach); Protein Extracts Diagnostic-P. D. and Co. Group 20 (Colon Bacillus, Gonococcus, Staphylococcus Albus, Staphylococcus Aureus, Staphylococcus Citreus); Protein Extracts Diagnostic-P. D. and Co. Group 21 (Friedlander Bacillus, Micrococcus Catarrhalis, Micrococcus Tetragenus, Pseudodiphtheria Bacillus); Protein Extracts Diagnostic-P. D. and Co. Group 22 (Pneumococcus Types I, II, and III, Streptococcus Hemolytic, Streptococcus Non-Hemolytic); Protein Extracts Diagnostic-P. D. and Co. Group 23 (Typhoid Bacillus, Paratyphoid Bacillus A, Paratyphoid Bacillus B). Parke, Davis and Co., Detroit.

Whooping Cough Vaccine X Plain.—A Bacillus pertussis vaccine (New and Non-official Remedies, 1924, p. 320) marketed in packages of four 1 c.c. carpules (tubes) containing, respectively, 500 million, 1,000 million, 1,500 million and 2,000 million killed bacteria per c.c. and in packages of ten 1 c.c. carpules, each contaning 2,000 million killed bacteria per c.c. Cook Laboratories, Inc., Chicago.

Staphylococcus Vaccine (Combined).—A staphylococcus vaccine (New and Non-official Remedies, 1924, p. 323) containing killed Staphylococcus albus and killed Staphylococcus aureus in equal proportions. It is marketed in packages of four 1 c.c. carpules (tubes) containing, respectively, 500 million, 1,000 million, 1,500 million and 2,000 million killed bacteria per c.c.; in single 1 c.c. carpule packages containing 2,000 million killed bacteria per c.c.; and in packages of ten 1 c.c. carpules, each containing 2,000 million killed bacteria per c.c. Cook Laboratories, Inc., Chicago.

Streptococcus Vaccine X Plain.—A streptococcus vaccine (New and Non-official Remedies, 1924, p. 325) marketed in packages of four 1 c.c. carpules (tubes) containing, respectively, 125 million, 250 million, 375 million and 500 million killed bacteria per c.c., in single 1 c.c. carpule packages containing 500 million killed bacteria per c.c. and in packages of ten c.c. carpules each containing 500 million killed bacteria per c.c. Cook Laboratories, Inc., Chicago. (Jour. A. M. A., Apr. 25, 1925, p. 1273.)

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

The regular dinner and meeting of the Minneapolis Surgical Society was held at the Elks Club, Feb. 5, 1925.

Dr. A. A. Zierold read a paper on the "Surgery of Hypertrophic Pyloric Stenosis," illustrated by lantern slides. The paper was discussed by Drs. Farr, Hayes and Zierold (See page 393).

Dr. R. C. Webb reported the following case of "Teratoma Testis: Located in the Abdomen."

Mr. A. F., twenty-seven years of age, salesman, admitted to Asbury Hospital, Jan. 20, 1925, discharged Feb. 3, 1925.

Family History.—Father living and well, 60 years of age. Mother living and well, 49 years of age. One brother living and well, 18 years of age.

Complaint.—Heavy feeling in abdomen and lump in abdomen, pain in small of back, frequency of urination, general run-down feeling and thought he was getting thinner, face was becoming drawn, and complained of lack of energy.

Present Illness.—In June, 1924, first noticed a lump in the right lower abdomen. It seemed to extend to the midline. His mother says that he complained of this lump three years ago. This lump seemed to be growing rapidly larger since June, 1924. In June, 1924, he noticed that he had to urinate frequently. This was not accompanied by pain but was merely the sensation of a full bladder. During the night had urinated two to four times since June. In the daytime if he drank a glass of warm water he would be required to urinate in about twenty minutes and two more times in the next half hour or hour. If he didn't drink water he could go several hours.

During the summer of 1924 if he walked much he would notice a heavy feeling in lower abdomen. During the past week or two the heavy feeling was constant when he was up and about.

During the fall of 1924 when he did considerable walking he noticed a dull pain in the small of the back about the same on both sides. This increased to the point where it was steady when he was up and about but was not present when sitting. He would notice it at night when lying down during the past two months.

About Oct. 1, 1924, he noticed that he didn't seem to feel energetic or ambitious and in November he noticed difficulty in getting to sleep. He would feel tired and irritable upon getting up in the morning. At about this time he felt that he was getting thinner and that his face was becoming more drawn. First went to a physician on Jan. 18, 1925, on account of the above complaints. Tumor did not cause constipation.

Past History.—Always healthy and strong until about 1919, when, after working in an office for about fifteen months, he became "run down" and consulted a physician and readily recovered with change of environment. In 1915 he was operated upon for an undescended right testicle and right inguinal hernia at the Midway General Hospital. The undescended testicle was presumably removed. (This was confirmed by conversation with his physician.) The testicle was never palpable to the patient and so far as he knew it was not in the scrotum or the canal and he supposed it was inside his abdomen. Rupture appeared after pertussis.

Tonsils removed one year ago. Had measles, mumps, whooping cough, chickenpox, smallpox. Supposed to have had Bright's disease at age of three years. Had influenza in 1918 and again in 1919. Systemic history otherwise negative. Married in 1917 until 1922. There had been no increased libido or potency and he thinks there has been a decrease during past six or seven years.

Habits.—Occasionally smokes cigarets. No definite alcoholism. Average weight, 135. Last weight, 127 pounds.

Physical Examination.—Fairly well developed and nourished young man who appears in good health. The general physical findings are normal.

Abdominal examination reveals a large rounded cystic mass in the lower abdomen and this mass is revealed by inspection when the patient lies on the table. On palpation it is found to extend about one-half way up to the umbilicus from the symphysis. The mass fills the pelvis and extends slightly more to the right side than to the left. It is slightly tender on palpation. Auscultation negative. No local increase in temperature noted.

Rectal examination reveals a mass in the pelvis which is readily found on palpation. The mass feels cystic, fills the entire pelvis and a transmitted impulse can be felt on bimanual examination.

Urine normal.

Blood examination showed white blood count of 7,000 with 86 per cent of p.m.n.'s.

Temperature was 100° F. on two occasions on day before operation. Pulse and respirations were normal.

Operation.—Jan. 21, 1925, lower right rectus incision six inches long under local anesthesia. Large immovable tumor found. Anesthesia changed to gas and ether. The tumor was found to be firmly wedged into the pelvis and extending upward to a point midway between symphysis pubis and umbilicus. There was an attachment to the abdominal wall at a point midway between the right internal inguinal ring and the middle of the right iliac vessels. When this attachment was removed it was found to consist of vessels of the cord and the vas deferens.

The tumor became free and was readily delivered through abdominal wound. There was no evidence of enlarged lymph nodes over the abdominal great vessels. The appendix was removed and the incision closed.

Convalescence uneventful, the patient leaving the hospital on the thirteenth day.

The tumor measured six inches long and four inches thick and was of the shape of a hen's egg and resembled a testicle in coverings and appearance.

On longitudinal section it contained about four ounces of bloody fluid which was located in the degenerated center and in a few scattered cystic cavities. The central portion was of a cheesy color and was greatly degenerated, there being about an ounce of the material of the consistency of cottage cheese, but with a yellowish tinge. Through this degenerated portion a ramification of fibrous tissue presented. At the bottom of the tumor, near the point of attachment, there were some small areas resembling scattered islands of cartilage.

The microscopic examination revealed a picture made up of large round polyhedral cells possessing voluminous nuclei and a much reduced protoplasm. The nuclei were deeply staining and in various stages of subdivision, while the cytoplasm was pale. There were areas of hyaline and colloid degeneration present. There were some small areas resembling epithelial elements and others resembling muscle tissue. Diagnosis: Teratoma testis, mixed type.

The patient has been referred for deep *x*-ray therapy to the areas of possible immediate metastasis below the level of the renal vessels.

Discussion.—In a recent article, Tanner collected 101 cases of malignant tumor of the testicle. As a result of his study he makes the rather interesting statement that the abdominally located testicle is relatively immune to malignant changes, whereas the testicle in the inguinal canal is more apt to become malignant than in the scrotum.

In this case the patient states that the testicle was never present in the scrotum or the canal and his physician states that at the time of the first operation, approximately ten years ago, the testicle was in the abdominal cavity. His physician, however, states that he remembers the operation well and that the testis was found and removed. Unfortunately, the operation was performed in a hospital in which the records were poorly kept and there has since been a fire which destroyed some records. Our information concerning his present condition is based on the finding of a tumor resembling a testicle which was present on the distal end of an abdominally situated vas deferens and vessels resembling those of the spermatic vessels and cord.

Gross specimen of teratoma testis.

Tanner classifies these tumors as follows:

A. Malignant:
   1. Carcinomatous, large cell, large nucleus type undoubtedly closely related to
   2. Mixed tumor type
      a. Tumors containing cartilage, cysts, glands, etc.
      b. Ordinary glandular structure tumors
      c. Chorio-epithelioma

B. Benign:
   1. Dermoid
   2. Epithelial
      a. Adenoma of the seminal tubules
   3. Mesoblastic
      a. Interstitial cell tumors
      b. Fibroma
      c. Lipoma, Myxoma

In his studies of records of 600 cases the disease occurred about once in 2,000 hospital admissions. In a series of 465 cases which were followed, 81 per cent were found to be dead and 5.5 per cent were found to be living four years after operation. The mixed tumor type were found to be more malignant than the carcinomatous type. The prognosis in the abdominal type of tumor is considered especially bad inasmuch as the patients present themselves late in the disease.

Treatment consists in castration combined with some other procedure inasmuch as the results from castration alone have been disappointing. Coley's serum is mentioned as usual, but in a series of 52 cases quoted by Tanner, three survived the four-year period, which is approximately the percentage given by others. When the scrotum is involved the inguinal lymphatics should be included in the operative treatment. A further operation is advocated by Hinman among others and this consists in making a prolonged inguinal incision and stripping up the peritoneum as in the operation for removal of ureteral stone and removing the lymphatics overlying the abdominal vessels. With the advent of the deep *x*-ray therapy it is possible that additional help may be recorded.*

DISCUSSION

DR. K. BULKLEY: This case report of Dr. Webb is of peculiar interest because of the rarity of malignant disease of an abdominal testicle. It has been of particular interest to me inasmuch as I had occasion to look up the literature on the subject and report a case in Surgery, Gynecology and Obstetrics in 1913. The case I then reported was that of a patient, aged 42, who accidentally discovered a mass in the left side of his abdomen. He had been married for many years but his wife had never been pregnant. This patient was operated upon in January, 1911, and a mixed tumor of the testicle removed together with a section of small intestine which was adherent to it. I am calling this case to your attention at the present time inasmuch as it demonstrates that all such cases are not necessarily fatal. No gland dissection was done on this patient and yet when last heard of, about a year and one-half ago, this patient was still well and in good health.

There has been much discussion as to the exact pathology of these cases. Ewing considers that all of them originate in the rete testis. They are all of them encapsulated and for this reason peritoneal implantation is not common. Ewing considers them all to be teratomata irre-

*Subsequent history case of A. F. Teratoma of Testis, Dr. Webb. April 27, 1925, notes.

Deep x-ray therapy was given by Dr. R. G. Allison as follows: In six sittings 1150 milliampere minutes of radiation were given to the right iliac and lower dorsal regions over a period of two weeks, ending Feb. 15, 1925.

The patient improved greatly and kept a weight chart which was as follows: February 13—118; February 22—121; March 1—123; March 8—125.5. He then had an attack of influenza.

The record was resumed March 29, when it was 128.5. April 5, 132, and April 19, 137.5. His greatest previous weight at any time in his life was 134.

He had no symptoms. A further series of deep x-ray treatments is being given.

spective of whether carcinomatous, sarcomatous or other types of tissue predominate. Practically all of them extend by the lymphatics. It is rare to find extension by the blood stream. The one type which may extend by the blood stream is the chorio-epithelioma and only two such cases as far as I know have been reported.

Dr. T. H. Sweetser: There is one type of tumor of the testis, the chorionepithelioma or chorioma, which is liable to metastasize extensively before the primary tumor of the testis has become of sufficient size to be noted clinically. I remember performing an autopsy while on the pathological service of the University, in which there had been no suspicion of tumor of the testis clinically,—and it was not suspected during the external examination at autopsy. The true condition was revealed only after finding large very hemorrhagic tumor growths in the spleen, lungs, and other organs. Of course, if such a growth had originated in an intra-abdominal testis, the metastases would have given the first possible warning of any tumor growth.

The meeting adjourned.

Willard D. White, Secretary.

CASE REPORTS

Members are requested to report interesting and unusual cases for publication in this department. Many cases reported at hospital staff meetings and similar meetings are very instructive and worthy of publication.

CASE REPORT: MINNEAPOLIS GENERAL HOSPITAL

Division A, Medicine and Obstetrics
Dr. H. L. Ulrich and Dr. F. L. Adair
Chiefs of Service
Purpura Hemorrhagica and Pregnancy
By Dr. Archie Cardle and Dr. J. A. Urner
Residents in Obstetrics and Gynecology

Patient was admitted to the hospital November 3, 1924. Age, 22 years. Para I; Gravida II (seven months). P. C.: Epistaxis, three months; subdermal hemorrhages, three months; hemorrhages from gums, three months; pregnancy, seven months.

For the past three months the patient had had severe attacks of epistaxis, occurring about twice a week and lasting from five to eight hours at a time. The loss of blood with each attack was about one cupful and the bleeding was always worse from the right nostril. At times the bleeding could be controlled by packing the nose with cotton. The day before the patient entered the hospital she had had an attack in the morning and another during the night, lasting three hours each time. Subdermal hemorrhages had occurred on different parts of the body for the past three months, the skin becoming red, then yellow, and finally blue-black. The patient stated that she had also had some bleeding from the gums for the past three days. The last menstrual period was April 10 to 23, 1924. All symptoms had occurred in the past three months.

Of acute infectious diseases, the patient had had only influenza. She had occasional headaches, of the frontal type. The tonsils had been removed. Cardio-vascular gastro-intestinal, genito-urinary, and nervous systems were negative. The patient said that as a child she had had occasional attacks of epistaxis, but very slight, and said also that she bruised very easily.

Menses were variable and the period was quite severe for from six to seven days. While carrying the first baby the patient had some black and blue spots on legs and thighs and had occasional slight nose-bleed. The baby was normal and showed no blue spots.

Physical examination: The patient was a white, married woman, lying comfortably in bed, without pain or respiratory distress. The skin and mucosa were normal in appearance over most of the body. Around each knee there were a number of subcutaneous hemorrhages, black, not tender, and ranging in size from a pea to a twenty-five-cent piece. One large subcutaneous hemorrhage, about 2 inches in diameter, was found on the dorsal surface of the left forearm, and also a fresh hemorrhage on the medial surface of the right elbow. Smaller hemorrhagic spots were found on the forearms, chest, and abdomen. Examination of the gums revealed many fine bleeding points.

The heart was normal in size, the sounds were clear and regular, and there were no murmurs. The blood pressure was 105/75.

The abdomen was distended with a seven months' pregnant uterus. A few small subcutaneous hemorrhages were noted on the upper abdomen. Gravid uterus was palpable. The spleen was not felt. There was no tenderness or rigidity. Diastasis of recti was marked about the umbilicus.

The spine and back, and the extremities and reflexes were negative.

A provisional diagnosis of purpura hemorrhagica and pregnancy, seven months, was made.

Progress notes:

November 5.—Epistaxis, with loss of blood estimated at 200 c.c. Bleeding stopped spontaneously. Thirty cubic centimeters of whole blood were given intramuscularly.

November 6.—Epistaxis in the afternoon, which could not be controlled with local treatment. Four hundred cubic centimeters of citrated blood were given, followed by a slight reaction.

November 10.—Slight hemorrhage from nose which was easily controlled locally.

November 11.—Nasal hemorrhage at midnight; controlled locally.

November 13.—The patient had an uneventful day until 5 P. M., when she had a marked epistaxis and an emesis of a large amount of blood which she had swallowed. The hemorrhage was finally controlled. The spleen was not palpable.

November 14.—Four hundred cubic centimeters of citrated blood were given.

November 17.—The patient was feeling well. Platelet count was 100,000.

November 20.—The patient had another hemorrhage this morning. It was controlled locally.

November 22.—A transfusion of 500 c.c. of citrated blood was given, with slight reaction.

November 24.—A retrotonsillar abscess was opened.

December 2.—The patient's condition was good until

today, when she had another nasal hemorrhage. Another transfusion was given.

December 3.—The patient had labor pains for about three hours last night.

December 4.—Platelet count was 75,000. Patient was feeling well.

December 14.—Another peritonsillar abscess was opened on the right side.

BLOOD

Date	Hemoglobin Von Fleischl	Erythrocytes	Leucocytes	Platelets	C. T.	B. T.
Nov. 3	63%	3,510,000	17,200	125,000	6 min. 15 sec.	8 min. 43 sec.
Nov. 7	56%	2,560,000	19,800	215,000		
Nov. 10	56%	2,780,000	8,700	25,000	Fragility Test: Hemolysis began at .46% and was complete at .34%	
Nov. 11				45,000		
Nov. 13	49%	2,580,000	8,800			
Nov. 15	42%	2,000,000		50,000		
Nov. 17	45%	2,330,000	12,400	100,000		
Nov. 21	47%	2,520,000	18,800	50,000		
Nov. 23				40,000		
Nov. 25	49%	2,830,000	16,000	100,000		
Nov. 26				50,000		
Dec. 1	45%	2,600,000	9,300	75,000		
Dec. 2				100,000		
Dec. 6				70,000		
Dec. 9	49%	3,170,000		75,000		
Dec. 10	Coagulation time 5 min.					
Dec. 15	47%	3,150,000	13,500	75,000		
Dec. 18				150,000		
Dec. 19	52%	3,250,000		160,000		
Dec. 20				150,000		
Dec. 21				115,000		
Dec. 22				200,000		
Dec. 23				215,000		
Dec. 24	56%	3,100,000		170,000		
Dec. 27				170,000		
Dec. 31				80,000		
Jan. 2	75%	3,740,000		150,000		
Jan. 6				150,000		
Jan. 8	70%	4,600,000	9,500	100,000		
Jan. 12	70%	4,620,000		150,000		

December 17.—Last evening labor pains began very definitely and the patient was transferred to the obstetrical service.

There was no rise in temperature of any importance during the entire hospital course. The pulse rate increased in direct proportion to the amount of hemorrhage.

A special nasal examination was made and revealed numerous ulcerated areas in the anterior part of both nasal cavities, especially Kiesselbach's area.

The eye grounds were negative.

At about 8:30 A. M., December 17, the patient was transferred from the medical service to the obstetrical service. She was in active labor, with pain at regular intervals, and bloody show. Examination at 9 A. M. revealed two fingers dilatation, cervix thick, membranes intact, O. L. A. position, and fetal heart rate 135, very regular, in the left lower quadrant. Pains occurred at about five-minute intervals and lasted about fifteen to twenty seconds.

At 10 A. M. the dilatation was about three and one-half fingers, with the cervix dilating well and thinning out, and the membranes still intact. The fetal heart rate was 142 and regular. The pains became progressively more severe.

At 11:30 A. M. dilatation was nearly complete, the bag of waters was intact, in front of the head, the fetal heart was still in good condition, bloody show was very scant, and the pain had increased somewhat in severity. The patient was co-operating well. At 12 o'colck she was put on the table and at 12:45 the membranes ruptured. This was followed by very rapid descent of the head and at 1:10 P. M. a normal, full term, female child was delivered. There were no lacerations and the total loss of blood (measured) was 100 c.c. Pituitrin and ergot were given and the patient was put to bed with slight oozing and in very good condition. Her postpartum course was entirely normal. Her temperature remained normal and there was

no further bleeding during the time she was on the obstetrical service. The blood reports were as follows:

Date	Hemoglobin Von Fleischl	Erythrocytes	Leucocytes	Platelets
Dec. 17	45%	2,330,000	12,400	100,000
Dec. 21	47%	2,520,000	18,800	50,000
Dec. 23				40,000
Dec. 25	49%	2,830,000	16,000	100,000
Dec. 26	45%	2,600,000	9,300	75,000

The patient was again sent to the medical service, where she remained until her discharge.

The infant was a normal, female child, weighing 3100 gm. at birth. The child breathed spontaneously upon delivery and on physical examination it was found to be normal in all respects. The bleeding time and clotting time on the day of birth were normal. The urine was negative. Studies of the blood were made as follows:

	Platelet count
Dec. 18	80,000
Dec. 19	75,000
Dec. 20	100,000
Dec. 21	36,000
Dec. 22	50,000
Dec. 23	25,000

On December 23, 15 c.c. of whole blood were given intramuscularly. On this date the hemoglobin was 90 per cent, erythrocytes 6,000,000, leucocytes 15,900, polymorphonuclears 49 per cent, lymphocytes 43 per cent, transitionals 3 per cent, and plasma 5 per cent. The bleeding time was five minutes and the clotting time three minutes. December 24 the platelet count was 30,000. December 25, 15 c.c. of whole blood were given. December 27 the platelet count was 100,000. The patient was then on the pediatric service and no further notes or reports were made. The gain in weight was rather slow, but otherwise the child had an uneventful course in the hospital. It was discharged January 12, 1925.

OMENTAL TORSION: CASE REPORT

By Drs. J. W. and P. M. Gamble
Albert Lea, Minn.

Mrs. J. H. K.; married; age 34.

Onset December 26, 1924, with indefinite distress throughout abdomen, chiefly around the umbilicus and to the right of it. No nausea or vomiting. No chills or fever. Appetite good. Bowels regular. Patient was up and around until the morning of December 30th, when the dull abdominal pain increased to such an extent that she was forced to take to her bed and medical advice was sought.

Patient was first seen by us at 11 a. m. December 30th. The history taken at that time did not elicit anything more as to the present illness than what is mentioned above. The past history was entirely negative except for the usual diseases of childhood, and an indefinite history of peptic ulcer some fifteen years previous. The patient had been treated for ulcer at that time by a physician and the condition entirely relieved. Also for the past six years, and especially for the past two years, the patient had complained of a feeling as though there was something growing in the lower right abdomen. There was no history of any attack in the past similar to this one. The family and marital history was negative. The patient was the mother of two healthy children, 7 and 10 years old. She had one miscarriage at four months eight and one-half years ago. The venereal history was negative.

Physical examination was negative except for abdomen and pelvis.

The abdomen was symmetrical throughout and no peristaltic waves or other abnormalities were made out on inspection. The whole right abdomen was exquisitely tender and the slightest pressure caused intense and definite pain. This was especially true one inch above McBurney's point. This exquisite tenderness was associated with a definite rigidity over the whole right abdomen.

On bimanual examination a definite resistance was felt in the right adnexal region. However, no definite mass was made out and the patient was but very slightly tender vaginally.

There was no elevation of temperature. The pulse was 88 and of good quality. Urine examination was entirely negative. The white blood count was 5,600.

The tentative diagnosis of: (1) ovarian cyst with twisted pedicle, (2) atypical appendicitis, (3) Meckel's diverticulitis was made. The patient was advised to enter the hospital for an exploratory laparotomy, but refused.

The patient was seen by us again on the morning of December 31st. The findings were practically the same as on the previous day except that the tenderness had increased so much that the patient would scarcely allow us to touch the right side of her abdomen. Vaginal findings were the same as on December 30th. The temperature and pulse remained normal, appetite good, and patient continued to have good bowel movements. The patient told us the pain increased markedly if she turned on one side or the other, and that she felt best if she remained absolutely quiet on her back. The differential diagnosis remained the same in our minds as enumerated above. The patient was again strongly urged to enter the hospital for an exploratory, but again refused.

At 2 a. m., January 1, 1925, one of us was called because of the increasing severity of the pain. The physical findings were the same as on December 31st. The temperature was 99.4 degrees and the pulse was 96. There was no nausea or vomiting. The white blood count was 18,200. The urine was negative. We advised immediate operative interference. Dr. W. I. King, Albert Lea, Minn., was called in consultation and was of the same opinion. The patient was operated on early January 1st.

On operation the pelvis was found to be entirely negative except for a definite and quite marked congestion. The same congestion was present in all the viscera of the peritoneal cavity. The appendix was kinked on itself three times but otherwise appeared quite normal. In the upper right abdomen, about one inch above the level of the umbilicus and on a level with the outer border of the right rectus, the greater omentum was found to be adherent to the parietal peritoneum over a space about the size of a silver dollar. There were no adhesions between the viscera and the omentum and there was no free fluid in the abdominal cavity. Thinking the condition might have perhaps been caused by a very small perforation in either the

stomach, duodenum or gallbladder, a very careful examination of these organs was made but nothing was found.

The omentum was readily freed from the parietal peritoneum and a goodly portion of it was seen to be twisted on itself once, forming a ball about the size of a lemon. The blood vessels in the part involved in the torsion were thrombosed and the tissue involved showed definite gangrene. The whole lower border of the omental apron was injected and the vessels were partially thrombosed. The omentum involved was excised and the appendix removed. The abdomen was closed in the usual manner without drainage.

The patient made an uneventful recovery and left the hospital in two weeks. Four months after operation the patient reports that she is feeling the best she has felt for the last six years.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

MEDICINE

SUPERVISORS:
F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

THE COMPARATIVE VALUE OF BLOOD TRANSFUSION AND BLOOD TONICS IN SECONDARY ANEMIAS: Martin Lewis Janes, M.D., New York (Abstract from the Am. Jour. of Med. Sciences, April, 1925). The reasons for the widespread use of blood transfusion in recent years is due to: (1) The recognition of the procedure as an effective therapeutic agent. (2) The observation of iso-agglutination and the method of grouping of Jansky and Moss. (3) The elimination of highly tchnical mechanical difficulties.

The use of iron in the treatment of anemia has been carried out since Menghis, in 1746, who reported that he had found iron in the blood of man; and since Abderhalden, in 1906, abandoned his contention that inorganic iron could not be converted into hemoglobin, it has been generally accepted as a valuable therapeutic agent.

Whipple, in 1920, showed that inorganic iron, or arsenic, has little or no effect on blood regeneration without proper diet.

The writer's experiments have been carried on for the purpose of estimating the value of inorganic iron administration and blood transfusions respectively. The nature of the experiment was explained to the patients, and a thorough physical examination was made to search for any signs of damage or deficiency of the blood-forming organs, and the presence of any syphilitic taint. Only young and middle-aged individuals of both sexes were used, who were suffering from anemia due either to acute or chronic illness.

It was found that the administration of iron and arsenic, in the form of saccharated iron, Fowler's solution, Blaud's pills, Basham's mixture, saccharated iron iodide, and ammonio-citrate of iron, showed only a gain of 5 per cent in the hemoglobin, and 200,000 red blood cells, in the course of thirty days, whereas blood transfusions caused an average increase in the hemoglobin of 21 per cent, and 800,000 red blood cells, with a corresponding improvement in the general physical condition of the patients.

The writer therefore concludes that iron and arsenic preparations exercise practically no beneficial influence, and that blood transfusions accomplish the desired effect in a shorter period of time, and with a much greater degree of efficiency.

F. J. HIRSCHBOECK, M.D.

DUODENAL ULCER: AN ANATOMIC STUDY: H. E. Robertson, M.D., Estes H. Hargis, M.D., Mayo Clinic, Rochester, Minn. (Abstract from the Med. Clinics of North America, January, 1925). This interesting article is well worthy of reading by anyone interested in the complex subject of duodenal ulcer. The physiological and anatomical relationships of the duodenum are considered, followed by a comprehensive history of the disease from the time of Galen, who first mentioned ulcer of the stomach, and the casual recognition of duodenal ulcer in the Seventeenth Century. Careful statistics are a development of the last few years, and the writers conclude, as a result of their observation, that there is a distinct increase in the incidence of duodenal ulcer, beginning about twenty-five years ago, although they call attention to the fact that when the attention is focused on finding ulcers (or anything else) they are likely to be more numerous than in the ordinary routine examination.

In two thousand routine postmortem examinations at the Mayo clinic between the years 1920 and 1924, 18.9 per cent disclosed evidence of gastric or duodenal ulcer, 37 per cent of which were gastric and 63 per cent duodenal. In 7 per cent, both the stomach and duodenum showed evidences of ulceration.

As is well known clinically, there was a singular paucity of ulcerations in the remainder of the gastrointestinal apparatus.

Twenty-one per cent of the gastric ulcers, and 40 per cent of the duodenal ulcers were healed.

It is undoubted that many of these ulcers heal of their own accord without any consistent treatment.

Errors in the roentgenologic diagnosis of healing are several. In gastric ulcer there is frequently a misinterpretation of healing shortly after the institution of treatment, due to the deposition of a plug of mucus in the crater of the ulcer, which gives an apparent effect of healing, which is not real. In the healed duodenal ulcers there is frequently a pouching of the first portion of the duodenum, due to a contraction in length of the organ. This reveals itself frequently as a deformity, or even as a diverticulum;

sometimes construed as an active ulcerative process, whereas healing has occurred. The contraction, pouching and displacement, of the healed duodenal ulcer, may cause duodenal stasis and a resulting intoxication.

F. J. HIRSCHBOECK, M.D.

PEDIATRICS

SUPERVISORS:

CHESTER A. STEWART,
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ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

SELECTION OF SUGARS IN INFANT FEEDING: Randolph G. Flood, M.D. (Archives of Pediatrics, January, 1925). Up to the present time, sugars have been administered from a purely empirical point of view, with very little accurate knowledge of their exact metabolic behavior.

Dextrose is the most readily absorbed of all the sugars. It is probably the only sugar that passes the intestinal wall of the healthy infant as such and we believe that all the other monosaccharides must be converted to dextrose before absorption. This fact would explain the slow rise of the blood sugar curves for the other two monosaccharides, galactose and levulose. In short, dextrose can be absorbed without the energy expansion needed by galactose and levulose to convert them to dextrose.

Because of this, the marantic infant, with marked limitation of digestive energy, handles dextrose most readily. The ease and speed of absorption of this type of sugar makes it especially valuable in fermentative diarrheas, where it is necessary to supply some type of sugar as an antiketogenic agent, because it is entirely absorbed by the small intestines, and there is no pabulum to reach the colon to undergo fermentation. Karo corn syrup is a representative sugar of this group. It is quite inexpensive.

The above statements are true for maltose and the varoius dextri-maltose preparations. Honey owes its ease of absorption to the free available dextrose in the mixture, and its laxative action to the levulose fraction, which is absorbed slowly, so that it eventually reaches the large intestine. These properties make honey a very valuable sugar in the treatment of constipated bottle fed infants, and in our hands have benefited these children a great deal.

The second group contains those sugars which do not give only dextrose on complete hydrolysis, namely, cane sugar, and lactose. These sugars are characterized by a prolonged absorption time, with a fairly low apex of the absorption curve, and some laxative properties. Lactose is a good example of this group. Quoting Holt: "Lactose is slightly laxative. In all intestinal disturbances, particularly where there is a tendency toward looseness of the bowels, lactose is poorly borne."

Cane sugar, the second sugar of this group, showed an interesting absorption curve. Weight curves are not as good with cane sugar as with dextrose. Sucrose has a very limited field with infants under three months. After this age, we have been able to demonstrate that the sugar is absorbed with increasing facility up to one year, after which period it is handled without difficulty.

R. N. ANDREWS, M.D.

THE USE OF GLUCOSE SOLUTIONS WITH INSULIN IN THE ACIDOSIS OF CHILDREN: C. F. Gelston. M.D. (Archives of Pediatrics, January, 1925). The clinical entity or entities called acidosis are unquestioned even though the etiology remains obscure. So-called cyclic vomiting is unquestionably one and, to the author's mind, this has a right to retain its position as a distinct syndrome.

It is Thalhimer's opinon that the ketosis occurs when either insufficient carbohydrate is supplied to the body or when the carbohydrate metabolism is subnormal. In either case, incomplete combustion of the carbohydrate means incomplete burning of the fat. In starvation, the first factor is involved. In post-operative acidosis and in the acidosis of pregnancy, there is an abnormality in the carbohydrate metabolism, with a resultant vicious circle as vomiting continues. Such a cycle is only broken when utilizable glucose is furnished to the body. It is demonstrated that the administration of insulin, either to diabetics or non-diabetics, accelerates the rapidity of utilization of body glucose, so that there is perfect logic in the use of insulin with glucose.

Case—A. S., age 2 years.

Child entered hospital April 19, 1924, with history of severe diarrhea of 5-6 watery stools daily, fever, and early restlessness, which later became semi-stupor, 3 days duration. There was refusal of food, very little vomiting. Examination showed a well developed and nourished child, anemic (hemoglobin 40 per cent, r. b. c. 3,250,000) dusty, gray pallor, apathetic and drowsy; if undisturbed, but very irritable when aroused. The lips were dry and parched, the tongue coated, the eyes rather listless and deeply sunken with the characteristic black rings underneath.

An intraperitoneal injection of normal salt solution was given that evening. The next day, April 19, the child was extremely toxic, temperature 105.4, pulse 200, respirations 60; eyes sunken. He was irrational, picking at the bed clothes. The abdomen was distended. Sugar, acetone and diacetic acid were present in the urine. His condition became rapidly worse and an intravenous injection of glucose and insulin was begun. Collapse occurred and death seemed imminent; 150 c.c. of 2 per cent glucose with 5 units of insulin (Lilly) were therefore given subcutaneously. Within two hours the child was rational, his color had improved, the temperature began to drop, food was taken regularly and retained, and by evening the urine showed much less sugar, acetone, diacetic acid, and albumen, and by the next morning these were entirely absent.

In the course of the next two days, this steady improvement continued. On the 23d of April he was given a transfusion of 250 c.c. of whole blood, non-citrated (Dr. Brooks), because of his anemia and because of the known great stimulative value of this procedure to the rehabilitation of tissues and body functions. He was discharged in good condition on March 5th.

If seen early and before too extensive liver damage has been done, the results are spectacularly and dramatically successful. The mortality of this acute condition allied to

the intoxication of Finkelstein has always been extremely high. Any maneuver reducing it should be promptly employed.

R. N. ANDREWS, M.D.

WEAK AND FLAT FOOT IN CHILDREN: Samuel W. Boorstein, M.D. (Archives of Pediatrics, March, 1925). The term weak foot or flat foot is applied to a faulty position of the foot impairing its weight-bearing strength.

Weak feet and foot strain are present in children though not to the same extent as in adults and should be treated before disastrous results ensue.

The predisposing causes are general weakness, excessive weight, rickets and contracted tendo-achilles.

The direct cause is disproportion between the strength of the foot and the weight and strain to which it is subjected.

The symptoms of weak feet in children are: deformity, tired feeling when walking, and occasionally pain.

The proper shoe from early childhood is a very important item as a preventive of future disability.

The child should be instructed to stand and walk properly, viz., the feet parallel or even slightly turned in.

The causative factor, as knock knees, etc., must be remedied so as to prevent recurrence of the foot disturbance.

The acute foot strain should be relieved by rest and adhesive plaster strappings.

The flexible weak feet are treated by strappings and exercises.

The short tendo-achilles should be lengthened either by stretching or open operation.

If the case is severe a metal support may have to be prescribed but this must be constructed scientifically so that the child should not depend permanently on this support.

R. N. ANDREWS, M.D.

INTRACARDIAC TRANSFUSION: Max Dunievitz, M.D., and Helen Bruckman, B.S., M.D. (Archives of Pediatrics, February, 1925). Report of a case. About six hours after birth the baby vomited brownish fluid with mucus and streaks of bright blood. Slight bleeding from the cord was also noted at this time, which soon became more profuse. The clotting time was taken and found to be 12 minutes (capillary tube method). Twenty c.c. of the mother's blood were injected into the buttocks. However, vomiting of material containing bright blood and bleeding from the cord continued.

The injection of mother's blood was repeated after six hours, without checking the bleeding.

On the morning of April 2, 20 c.c. of blood from another donor was given intramuscularly, but proved as ineffectual as the mother's blood in controlling the hemorrhage.

It was decided to attempt an injection directly into the heart. Forty c.c. of known Group IV blood was obtained (from Dr. Bruckman) in a luer syringe. The skin of the baby's chest had been previously sterilized with iodin and alcohol. The author (Dunievitz) introduced a No. 19 gauge intramuscular needle, attached to an empty syringe in the 4th interspace, about 2½ cm. to the left of the sternal border and directed medially and cephalad. As soon as blood could be withdrawn, indicating that the ventrical had been entered, the blood-containing luer was substituted for the empty one, and the blood slowly injected. Following this, there was definite but slight improvement in the child's condition. One hour later, 85 c.c. of the mother's blood was injected in the same manner. Immediately following this injection the color, pulse and respiration all improved markedly. No citrate was used.

On April 4, the clotting time had decreased to five minutes. The baby had been able to take and retain breast milk, and, aside from the swollen head, appeared normal.

On April 7, there was again some blood-streaked vomitus, so that another transfusion was deemed advisable. Fifty c.c. of blood was injected into the sagittal sinus without difficulty.

At the age of about five months, the baby contracted smallpox and died. No autopsy was obtained.

R. N. ANDREWS, M.D.,

GYNECOLOGY AND OBSTETRICS

SUPERVISORS:

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EXCISION OF THE CERVIX FOR ENDOCERVICITIS: Rattenberg and Schwartz (Surgery, Gynecology and Obstetrics, November, 1924). This author describes a technique for excision of the cervix in the treatment of endocervicitis. The distal end of an infected cervix shows marked inflammatory changes, but as the proximal end is approached near the internal os these changes are either barely perceptible or entirely absent, thus showing the efficacy of the surgical procedure described, so far as the removal of the infected area is concerned.

The operation consists of making anterior and posterior lips by an incision at the external os. Then one-half of the cervix, the entire granular area surrounding the upper portion of the cervical canal, is coned out. A vaginal flap previously liberated is then inverted into the hollowed out shell of the upper lip of the cervix and thus all the denuded areas are covered. The lower lip is then completed in a similar manner. The procedure cures the leukorrhea, does not interfere with normal dilatation during labor, and clears up the focal infection.

J. W. STINSON, M.D.

ROENTGENOLOGY

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A. U. DESJARDINS,
MAYO CLINIC, ROCHESTER

PNEUMONOKONIOSIS IN MINERS OF THE RUHR DISTRICT: A. Boehme (Forsch. a. d. Geb. d. Roentg., Feb., 1925, v. 33, p. 39). The author discusses in great detail the condition of the lungs in pneumonokoniosis in miners from the clinical and roentgenological standpoint. All of his findings are based upon work done on 1,500 miners, in all of whom roentgen examination of the lungs was done routinely. He finds that both coal and stone dust are equally responsible for this condition. The time factor is of more importance, thus the longer a miner has worked in a coal field the greater are the lung changes. He has found positive evidence of this condition, roentgenologically considered, in a group of 81 cases. Most of the cases were of mild form with mild lung changes and did not give any special clinical complaints. Only 3 patients complained of dyspnea.

Roentgenologically he finds the early changes in the lungs as a fine mottling; sometimes in a network in the middle portions, the strands extending toward both hili. The hili are enlarged and very dense and poorly outlined. These findings are usually symmetrical, although more prominent on the right side. In this stage none of the patients showed any subjective or objective clinical findings; vital capacity being about 3,000 ccm. In some of these cases the roentgenograms were similar to those of tuberculosis, but on account of the location of the changes in the middle portions of the lungs and their symmetry, they are easily recognized as non-tuberculous.

In the cases of longer duration, the lung changes were very marked, namely: large homogeneous shadows were present especially in the peripheral portions of the lungs; the lower portions are always free from any changes. This is very characteristic. Sometimes the apices are also involved. The shadows extend below the clavicle on each side and toward the lower lobe to about the fifth rib. The hili are markedly enlarged and very dense, while the free tissue between the hili and the large lateral shadows appears normal. This picture is so typical of pneumonokoniosis that it should never be mistaken for any other condition. It is found in patients that have worked on the average about 20 years as coal miners.

In the very serious cases there are definite clinical findings, such as dyspnea on exertion, pains in the sides. cough, expectoration and night sweats; bronchial breathing is increased, moist râles are present, vital capacity is reduced to 1,500 ccm. Roentgenologically they show very extreme changes. The lungs are very mottled with dense homogeneous shadows extending into both sides; the lower portions of the lungs also show many branchings. The heart shadow is very indefinite and the apices are also involved.

The most outstanding feature in the early cases is that the clinical findings, which are practically absent, do not correspond at all to the anatomic and roentgenologic findings.

The author expresses the view that tuberculosis is not found or associated with pneumonokoniosis. All of the patients affected with this condition have a very chronic course.

M. VELKOFF, M.D.

BASAL SKULL FRACTURES AS PROVEN BY ROENTGEN RAY EXAMINATION: Ernst G. Meyer (Forsch. a. d. Geb. d. Roentg., v. 33, p. 52, Feb., 1925). According to the author the reason why many basal skull fractures are found is because of the great distance between the object (fractured bone) and the film when the antero-posterior position is used.

The transverse basal fractures are found mostly through the middle skull fossa; while in the frontal and the posterior fossæ they are found very rarely. The fracture lines begin sometimes higher or lower in the lateral wall, sometimes going through the parietal bone at right angles to the middle fossa; in other cases reaching near the sella turcica when in some cases the anterior clinoid process is broken.

The fractures of the parietal, temporal and sphenoidal bones are brought out by exposing from the side as for a regular sella turcica position. One must be very careful not to mistake for fracture lines the blood vessel markings of the medial meningeal artery and its several tributaries, such as the tympanic and petrosal, which many times are well developed.

Occasionally there are longitudinal fractures of the base and most of them run through the labyrinth, where they will form or end in a star-like arrangement. Most of the fractures are produced by a great force applied to the skull. When fractures are produced through a fall on the feet the lines are usually arranged in a ring and are very hard to demonstrate.

M. VELKOFF, M.D.

BOOK REVIEWS

THE OXFORD MEDICINE. By Various Authors. Edited by Henry A. Christian, A.M., M.D., Hersey Professor of the Theory and Practice of Physic, Harvard University, and Sir James Mackenzie, M.D., F.R.C.P., LL.D., Consulting Physician to the London Hospital. In six volumes. Cloth. Price, $90 per set. New York: Oxford University Press, 1921.

Oxford Medicine is a monumental piece of collaboration which would be impossible of detailed review by any one individual. I have used this system since its first publication for general reading and for reference and feel that I have some appreciation of its value. There are three things which I think are outstanding in this publication:

1. It is well edited, easily readable, and is being carefully kept up to date, as I can testify from my own personal experience. The only criticism I would have of the editions that are from time to time being sent out is that they seem to be more expensive than one should expect. How-

ever, that is a matter on which I am not capable of giving any definite opinion.

2. The standard of authorship of the various sections is uniformly high. In other words, each article is an excellent monograph on the particular subject discussed.

3. The bibliography at the end of each article is very complete and valuable, and is being kept up to date.

This work consists of six large volumes, the first one dealing largely with the fundamental sciences; an attempt to bridge over the gap between these and clinical medicine. It is a very excellent volume for general reading and in my opinion is probably the most educational feature of the system. It also includes an article by Wilmer and Rowntree on "Aviation Medicine," a subject which is not covered to any extent in the average text-book.

The succeeding five volumes cover the whole field of medicine, including the nervous system. In the second volume is a very excellent discussion on gastrointestinal diseases and a very well-written article on peptic ulcer by Dr. Sippy. This gives in a very concise form the essentials of Sippy's method of handling ulcer and is of great importance to the profession because of Sippy's prominence in this field, and although one may not entirely agree with his theories he was one of the outstanding clinicians of the last generation who treated peptic ulcer more successfully than any one else so far.

In Volume 4 the discussion of metabolic diseases is very valuable and not so voluminous that it gives one mental indigestion.

There is a lot to be said in favor of the monographic style of publication, the most important of which, it seems to me, is the fact that you get in review the impressions of an authority on his particular subject as to the relative value of the literature and you get the individual work of the author.

I commend the Oxford series for general reading and for reference both to students and practitioners.

CHAS. B. WRIGHT, M.D.

THE MEDICAL CLINICS OF NORTH AMERICA. The Mayo Clinic Volume. Philadelphia: W. B. Saunders Company.

This volume, of about four hundred pages, consists of approximately thirty-five articles by members of the Mayo Clinic staff. There are no surgical contributions, but all other departments are well presented.

An objection has been offered that the articles are not of the usual clinic type, but, rather, formal medical articles on the subjects.

They are still largely statistical, as has been the custom in articles emanating from the Mayo Clinic, but they are representative of the careful work done there from the clinical, laboratory and research standpoints.

The article on "Duodenal Ulcer: An Anatomic Study," by Drs. Robertson and Hargis, is instructive and valuable.

The Department of Urology is well represented by articles on the differential diagnosis of diseases of the urinary tract, both medical and surgical, by Braasch and Keith, and one by Bumpus on "Pyelonephritis Treated With Mercurochrome."

Dr. William A. Plummer contributes an article on the interesting discovery in relation to the treatment of goiter with iodin notably in Graves' disease.

Brown's contribution on "Vascular Disease Affecting the Feet," which is more in conformity with the clinic idea, is comprehensive, and indicates careful work, in a field not notably emphasized in the literature.

Neurologists will find a study of one hundred cases of multiple sclerosis in relation to the ophthalmologic findings, by Gipner, of interest.

The subjects of "Headache" and "Vertigo," of universal interest to general practitioners, are comprehensively and extensively covered by Woltman and Parker.

Peterman establishes the low protein diet in epilepsy on a more consistent mathematical basis with the ketogenic diet.

The rôle of functional tests in diseases of the liver, by Dr. Rowntree, which promises to be of immense clinical value in the study of liver function, is considered in a careful analysis of their value.

F. J. HIRSCHBOECK, M.D.

ANESTHESIA FOR NURSES. Col. Wm. Webster, M.D., Winnipeg, Canada. C. V. Mosby Co., St. Louis, Mo., 1924.

The book is written in a very simple, concise form, covering the essential points in the history and physiology of anesthesia; anesthetic agents; methods and dangers of administration; explanations and illustrations and care of apparatus; preoperative and postoperative care of patient from the nurse's standpoint; an explanation of preoperative and postoperative medications and the advisability of an attempt on the nurse's part to get the patient's point of view.

K. CLEARY, R.N.

PATHOGENIC MICRO-ORGANISMS. W. H. Park, Anna W. Williams, and Charles Krumwiede. Eighth edition. Lea & Febiger, Philadelphia, 1924.

This is a new and somewhat enlarged edition of a well-known text-book. It has been brought up to date by the addition of brief discussions of various new discoveries in bacteriology, as the d'Herelle phenomenon, the wound anerobes, etc. It is quite complete and abundantly illustrated. The frequent tabulations of material which can be presented in this way, and particularly the inclusion of a very complete table of all the pathogenic organisms and their essential characters, should prove an aid to students. The new nomenclature of the Society of American Bacteriologists is given parallel with the older terminology, which should prevent confusion. While not too voluminous to be used as a text-book, it is sufficiently complete both in subject matter and references to serve as a reference work.

A. T. HENRICI.

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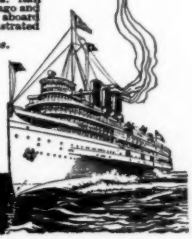

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